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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Namenana

Second-class postage paid at Boston, Mass., and additional mailing offices

Vol VII No 5 January 31, 1973

# ALLVYN FCWG **NEWS** BRIEF

### Index Erasure Saps Our Case: Justice

WASHINGTON, D.C.-Late last week the Justice Department acknowledged that the destruction of the computerized index of documents as part of the IBM/ CDC settlement could seriously hamper the government's antitrust efforts against IBM.

In a brief filed last Wednesday in a federal appeals court in New York, the Justice Department contended that IBM had violated agreed rules in secretly negotiating to destroy the data and further, it said, this destruction was a deliberate attempt to hamper the government in its case.

The Justice brief stated that IBM did not inform the government of the destruction agreement with CDC in connection

with the settlement. CDC is expected to respond to the government's charges with the defense that the destruction of data was entirely proper and "involved laying down the weapons of war between Control Data and IBM."

IBM, in accordance with a pretrial order prohibiting comment on either side, was "unable to comment."

### Application Filed For Arpa-Like Net WASHINGTON, D.C. - The first apply

cation for a resource-sharing or "valuecomputer/communications network has been filed with the Federal Communications Commission by Packet Communications Inc. (PCI).

### On the Inside This Week IBM Sues Telax On Trade Secrets -Page 21

Benchmark Techniques -Page 13				
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# ★ The 360 Lives On ★

# Grows Old...Like Fine

Don't scrap that 360 yet; there are ways to keep it going. See supplement following page 16.

### By Ronald A. Frank

Of the CW Staff
TACOMA, Wash. - While most 360 upgrades involve the addition of on-line peripherals, some users find they can enhance the efficiency of their system with off-line equipment.

'We had a purchased Model 30." said Ed Decker, director of data processing and finance for Day's Inc., a clothing manufacturer headquartered in Tacoma, Wash. "We wanted to add a remote processing capability but we did not want to upgrade to a larger system." he said.

With a goal of minimizing the finan-cial commitment, Decker wanted to get an "on-line, off-line system" that ould be as close to being on-line as

Day's acquired a terminal system configured with Datapoint 2200s which allows the firm's DP center to receive data on 9-track mag tape and transfer the reels onto the main-

frame system tape drives for entry into the 360/30. als were part of a three-The termi

pronged upgrade of the 30 that had some important benefits for Day's. "My biggest prohlem was that our purchased Model 30

purchased Model 30 was worth \$150,000 while our books showed an amortized value of \$220,000," Decker said. His goal, with minimum capital outlay was to increase the value of the

outlay was to increase the value of the system and thereby bring the Model 30 closer to its book price. "If we had upgraded to a larger mainframe we would have had a re-placement cost and also lost the amortization value," Decker ex-

Our utilization of the 2200s has (Continued on Page 4)



The 3742 dual data station contains two keyboards, two diskette drives and a shared visual display unit

# IBM Delivers 3740 Entry Unit to U.S.

Of the CW Staff

WHITE PLAINS, N.Y. = 18M's introduction of the 3740 Data Entry System into the U.S. is directed at users wishing to move data entry operations off-line and away from the central computing facility. The system was first introduced in Europe last September [CW, Oct. 4].

The basis of the system is the use of a floppy-disk stor-age media called "diskettes" by IBM.

Sealed in a plastic jacket, each diskette is 8 inches in diameter resembling a 45 rpm phono-

graph record and weighs a little over ounce, a spokesman said. The storage capacity of each diskette is 242K characters, or 1,898 128-character

Industry reaction on page 21

data records - roughly the equivalent of 3,000 80-column punched cards, the spokesman maintained

### Mail the Date

After data is recorded on a diskette, the plastic jacket can be sealed and recorded data mailed to a central data processing

facility, the spokesman said.

The difficulty in comparing the IBM 3740 to other available key-to-disk data entry systems is that presently there are no figures for average user throughput -

i.e., keystroke/hr.

While these figures are not available, the (Continued on Page 2)

# Mini-Based Fortran 5 Steals Job From 370

SOUTHBORO, Mass. — A Fortran program took only 16% longer to run on a Nova 800 mini than on a 370/145 mainframe in a recent user-controlled benchmark of the newly announced Fortran 5 mpiler from Data General.

complet from Data General.

Fortran 5 is a superset of Fortran IV and is compatible with ANS
Fortran, 1BM's Level H Fortran and Univac's Fortran V. It includes several language extensions and an object-code optimization process that is said to cut run times dramatically.

### 4 Vendors Selected

For his benchmarking, the user selected part of a large application and input the same source code to the IBM, and Data General compilers, as well as those of two other vendors. The test program was typical of the entire application, he said, but was the most

was typical of the entire application, he said, but was the most time-consuming part of the operation.

The user preferred anonymity in order to maintain a "competitive

Original industry.

The application handled production planning and optimization but the test portion involved only normal integer arithmetic. The floating-point capabilities of Fortran 5 were not tested.

The application is a production of the point o

The user had previously compiled the test program under Data General's Fortran IV and execution time then was 15 times as long

### Her Consinced

The Fortran 5 test results were dramatic enough so that the user now plans to move the entire application, including data communications support, from the 145 to the mini (Continued on Page 2)

### Analysis: IBM/CDC

on the Nova 800 as on the 145

# Why Was Index Destroyed?

Of the CW Staff
MINNEAPOLIS - "IBM must have had ing to hide

That is the reaction of one person close to the antitrust actions against IBM on learning last week that an important computerized index of the documents in the Control Data/IBM case had been destroyed as part of the settlement agree-

ment between the two And he was not the only one upset over the destruction of the index. Industry leaders and users both cried "foul." one industry organization called for a grand jury investigation of the incident ar

several people indicated the move might delay the government's case against IBM. ition, Telex filed suit in Federal District Court here asking that the entire settlement be overturned, claiming the records destroyed were supposed to have been made available to Telex for its sui against IBM [CW, Jan 24]

### How Did It Happen?

None of the actual 40 million documents filed in the case was destroyed as part of the bargain, but the index that helped identify specific documents was (Continued on Page 4)

# IBM Delivers 3740 Entry Unit in U.S.

(Continued from Page 1) other side of the trade-off is known

cost of each keystation Compared to the earlier buffered IBM 129 Model 3, the 3741 key-to-floppy-disk keystation rents for \$159/mo and the 129 rents for \$150/mo.

Compared with other vendor units which use a shared processor to support satellite stations, the IBM 3741 is almost

double the cost per entry station. Of course, users must add the cost of the shared processor to the cost of other vendor systems; but even with this addi-

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EDITORIAL DFFICES: 797 Weshington St. Newton, Mass. 02160. Phone: (617) 332-5606 TWX: 710-335-6635. Europe: Computerworld c/o IDC Europe 1.td., 59 Grays Inn Rd., Lon don, W.C.1, England (01-242-6908).

Second-class postage peid al Boston, Mess., and additional mailing offices. Published weekly (except: e single combined issue for the last week in December and the first week in Jenzey) by Computerworld, Inc., 797 Washington St., Newton, Mess. 02160. © 1973 by Computerworld, Inc.

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25 cents a copy; 59 e year in the U.S.; \$10 a yeer in Cenada; all other foreign, \$25 e yeer. MARQARET PHELAN, circulation manager. Four weeks' notice required for chenge of address. Address all subscription correspondence to circulation manager, Computerworld, 1979 Washington SI, Newton, Mass. 02160. 5

COMPUTERWORLD, INC.





OSTMASTER: Send Form 3579 (Change of Edress) to Computerworld Circulation Ocpt., 17 Washington St., Newton, Mess. 08180.

independent system.

example, a system consisting of 10 1BM 3741s - each with one diskette drive and no communications capabilities -rents for \$1,590/mo on a month-by-

th contract. A 10-keystation system from another typical vendor with shared processor

and con-Including communications verter - rents for around \$1.160/mo.

To support the user choosing the IBM key-to-diskette data entry approach, IBM announced the availability to domestic users of two data entry stations, a data

	1-me rental	2-yr rental	purchase
3741 (1)*	\$159	\$135	\$6,000
(2)**	224	190	8,430
BSCA***	194	165	7,280
3742	188	160	6,910
3747	461	395	19,560
3\$40 (1)	\$3\$	458	22,000
(2)	805	681	33,550
3713	159	135	\$,400

Ciskettes cost \$40 for a quentity of five.

\* with one diskette drive

\*\* with two diskette drives

\*\*\* with communications capability

Prices for Equipment in the 3740 Data Entry System

converter, a printer and an I/O unit - for direct transfer of data to and from larger remote processors.

The 3741 data station is designed primarily for stand-alone use, he noted.

The unit is composed of a microprogrammed control unit which contains all the logic for editing and inputting data, a typewriter-like keyboard, one or two diskette drives and a 240-character visual display in e format of 40-character lines.

Station to Station

When equipped with a binary synchronous communications adapter (BSCA), the 3741 can communicate with (BSCA), the 3741 can communicate with another 3741 having the BSCA, as well as specially equipped models of IBM 360 and 370 processors, he added.

The data station can also communicate with the 3747 data converter - another component of the 3740 Data Entry System - and can be directly attached to

tion it appears that the IBM system using more than 10 stations costs more than an odels of the System/3 disk system vis the local communications adapter.
The 3742 dual data station is essentially

The 3742 dual data station is essentially two single 3741 data stations grouped together with the option of permitting data to be copied from one operator's diskette drive to the other while records

diskette drive to the other while records are merged into a single diskette.

The unit incorporates a visual display, designed with mirror optics, permitting half the display – containing 120 characters in three lines – to be visible to each operator, for editing and formatting The 3747 data converter is a stand-

alone, off-line device for converting data from diskettes to standard 1/2-in, mag-The 3747 can also be equipped with a BSCA allowing communications with other data stations or IBM 360 and 370

The 3713 printer is a 40 char./sec matrix optional printer which attaches to the 3741 data station.



Printouts can be produced from data recorded on diskettes as well as information transmitted to the data station with BSCA from a central computer. The 3540, a systems 1/0 device, communicates directly to 1BM 370 models, by selector, channel, byte-multiplexer channel or block-multiplexer channel or block-multiplexer channel complexer.

record/min into the processor and can write up to 2,200 record/min from the

tures of the Real Time DOS.

A minimum Fortran 5 system includes a mini with 28K of core memory, 512K words of disk storage, the floating-point processor, hardware multiply/divide, a

magnetic tape transport and a console terminal. Configured around a Nova 800

jumbo, the system costs approximately \$48,000. A Nova 1200 would drop the cost to about \$42,000, Data General said.

Name That Hit Tune!

**But Computer Can't** 

HOLLYWOOD, Calif. - Computers can

r board is

The floating-point processor available separately for \$4,000.

# Mini-Based Fortran Steals Job

(Continued from Page 1)

Fortran 5 runs under the Real Time DOS and uses a new floating-point pro-cessor that can be added to any Nova-line with room for an extra circuit d. Average add time is less than 8

usec, the company noted.

The compiler uses a global approach to The compiler uses a global approach to optimization, reading in the entire original object code and plotting complete tree structure of its logic before making any modifications. This is the first global optimizer on a mini. Data General said.

Fortran 5 language and processor extensions include multitasking, with 256 possible priority levels; optimized DO loops; and reentrant code that allows many users to share a single copy of a program. It also supports fully recursive routines and in-line subscript handling, the com-

pany noted A full battery of English language diag-nostics is included for fast, easy de-bugging. Fortran 5 can use the flexible

create music, but they cannot determine what makes a hit record, according to Allen D. Allen. Allen, a composer and a research scientist, worked extensively with computers trying to find technical parallels among system and foreground/background

"Initially I tried to find a correlation between melodies I like," Allen said. "I took all the tunes – the chord struc-

"I took all the tunes — the chord struc-tures, tendency toward intervals, surprise, tempo, time signatures and all the other elements. There was absolutely, no cor-temposity of the control of the control that the control of the control of the "Then we did a study with an IBM II30 computer. This was to find what his records had in common. We used all the same factors (as for tunes) plus tone colors, instrumentations, tyrics, bottom or high end, etc. We could find abso-lutely no mathematical formula for a pleasing melody or a big-selling disk."

□ New subscription

# House Says 'Aye' to Vote System

WASHINGTON, D.C. - The House of Representatives' electronic roll call syspassed its first test last week - but was only on a quorum call. Officials said the system worked very well but no actual voting on a bill is expected for

Under the new system developed by Control Data, House members insert plasidentification cards in one of 44 voting stations scattered around the House chamber. Votes are channeled into a computer which produces a visual dis

play of the vote for verification and produces a hard copy of the outcome of the vote.

Rep. Wayne L. Hays (D-Ohio), chairman of the administration committee, said the system cost \$1.06 million but said the time saved would take care of the cost in

The traditional hand-tallied roll calls take about 25 minutes just to call the roll, but the automated system will take only 15 minutes for a full House vote.

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# Study Finds 40 Susceptible 360/30 Price Drop Seen

ELISFORD, N.Y. – A 10-year price-level forceast of 18th 360/30s and 40s by 18th 360/30s and 40s by 30 will slowly decline in price while keeping utility value and the 560/40s be vulnerable to new IBM announcement which may affect its marketability in the 1976-77 markets. During the lost quarter of 1972, 360/30 also were brisk, with demmad slightly also were brisk, with demmad slightly and the standard properties apply, the study stated.

### 30s Popular

This was most marked by an increase in the demand for smaller Model 30s. The study attributes the demand to users' acceptance of add-on memory — "a buyer will purchase a used 16K-byte machine, add 49K bytes of add-on and have a low-priced 65K-byte machine."

Presently many owners of 360/40s are reluctant to sell what they know is a "very solid system in terms of utility" for less than their idea of current market value, and thus, sales have been slow for all 40s, the study concluded.



Forecast of 360/40 Price Levels Expressed as a Percentage of List Price - 1973 to

Those sales taking place are reported to be 5% lower than prices during the sum-

### VS Upset Market

Model 50s and 65s have not fared well in the current market, the study main-tained. "While there have been flurries of interest..., the big systems market has been upset by the introduction of virtual

Many large system users are reportedly standing pat until they decide the best direction.

Another point of interest is the appearance of the IBM 370/145 on the used computer market. Prices are listed at about 85% of list when a user sells, and



This market is expected to intensify i.e., the number of 370s offered will increase – but the price will remain fairly level for most of 1973, the study fore-

A copy of the Blue Book of Used Com-puter Prices is free upon request from Time Brokers, Inc., 500 Executive Blvd., Elmsford, N.Y. 10549.



Forecast of 360/30 Price Levels Expressed as a Percentage of List Price – 1973 to 1983

## City Cleared After DP Misuse Charge

Special to Computerworld HONOLULU -- Although Larry E. HONOLULU — Although Larry E Stevens, who accused the mayor here of illegally using city computer ser vices to promote his successful bid for reelection, is still missing since Octo ber [CW, Dec. 20], city investigator

Only two mysterles remain - where is Stevens, and why did he say what he

Stevens claimed that between "\$50,000 and \$100,000 of taxpayers" money" in city computer services were ed for Mayor Frank F. Fasi's

Shortly after his October charge, police reported the Stevens car had been found at Honolulu International Airport with \$75 in the glove compart-

The widely publicized preelection allegations were investigated by the City

Council which investigated many com-plaints of Fasi's alleged misuse of city

The city Department of Information Systems, which Stevens said illegally merged voter registration tape files and Hawsiian Telephone Co. tape files of telephone numbers and addresses for the Fast campaign, came out of the City Council's learings with a clean bill of health.

Gerald L. Mann Jr., director of the Department of Information Systems, told Computerworld that "if anybody looks at Stevens' figures, they look ridiculous. There's no truth in it."

Stevens, he said, had formerly been an analyst with the department, but hadn't worked there for "two and a alf years prior to his announcement bout our department. He couldn't ave seen what he said he saw.

"I only wish," Mann said, "he would return to clear up the mystery,"

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# Thy Was Index Erased? What Effect Will This Have?

(Continued from Page 1) erased, sources indicated last

Reportedly, the IBM and CDC board of directors met on Fri-day, Jan. 12 and approved settle-

The lawyers for the two firms met the next day, in order to sign the settlement documents, sign the settlement documents, but someone, apparently the IBM legal team, halked until the disk packs with the index/access method to the microfilmed documents were erased and do-

The agreement was then

igned. Both IBM and CDC argue that Both IBM and CDC argue that the destruction of the records was customary procedure. Gen-erally when cases are settled out of court, the "work product" of the lawyers is destroyed, they

In most cases this consists of tentative trial plans, notes made in court, miscellaneous doo-dlings, etc. However, in this case the argument was used to cover the computer-based index to the documents filed in the case.

ocuments filed in the case.
Without the index and access
nethod, sources said, the docunents could be almost meaning-

less.
And, Telex argued, not only
did the destruction of the index
make the document collection
meaningless, but it was also in
direct violation of a court order.
The order issued last July by
Judge Philip Neville statted: "It is ordered that

statement of willingness to do so, will make available to the counsel for Telex all IBM docu-

ments in its possession and its o-called data base or index." The Telex motion to overturn the IBM/CDC settlement on these grounds was set for hearing late last week.

late last week.

In addition to the Telex action before the court, the Association of Data Processing Service Organizations (Adapso) last week called on the Justice Department to convene a grand jury to investigate whether the IBM/CDC deal did in fact violate the law.

oeal and in fact violate the law.

In a letter to Attorney General
Richard Kleindienst, the group
indicated that "the destruction
of materials... would have the
effect of delaying the government's antitrust litigation against
IBM for a substantial period of

In addition, Adapso said:
"There seems no apparent purpose to this surreptitious, clandestine action except to preclude our government and others clude our government and others from asserting rights to such materials."

Adapso also noted that "depending upon the precise nature of the conduct involved and the accompanying intent such conduct may be a violation of criminal law, a contempt of ex-isting court orders, and to the extent that attorneys partici-

nary rules governing the pro sional conduct of counsel. "We request that you exercise your power and responsibility as ihility as attorney general of the U.S., to conduct a grand jury investiga-tion into this matter so that appropriate remedial action may be taken." the letter concluded

### Analysis

It is hard at this time to asthe overall effect of the destrucon of the index to the doct menta, according to

It is known that Telex mainit is known that leiex main-tains its own index for the docu-ments that it plans to use in its case against IBM, scheduled to start in April.

start in April.

Sources close to Telex, however, indicated there may have been some documents it had overlooked in preparation for the case and that it would now be much harder to find them if

needed.
"Without the Control Data index to the documents, it might take years to find a specific

damaging document in the mil-lions of papers filed with Con-trol Data," a source said.

"There must have been some-thing to hide or else they would not have been so concerned that the index he destroyed.

"Maybe there were some par-icularly damaging documents that Telex has missed. Now it will never be able to find them without access to the index."

At the same time, Telex of-ficials indicated they were pre-pared to go ahead with their case and said they felt they had

enough evidence to win. The Justice Department has re mained mum on the entire set-tlement agreement, but sources close to the department indi-cated it is maintaining its own index to the documents in the

"But their index is nowbere as complete and comprehensive as the one maintained by Control Data," a legal source in Washing-

At the same time, he indicated the destruction of the index should not slow the department down greatly, even though it would have to add additional manpower to the case if it wanted to proceed as fast as

would have been possible with the help of CDC. Control Data President Willia

Norris defended his company's Norris usernoon actions.

In a letter to shareholders, employees and the press, Norris said: "In the first place, we were not forced to do anything. It is the control of t not forced to do anything. It is my firm judgment that disposing of the work product of our at-torneys, developed at our sole expense (many millions of dol-

lars) for use by us in our case, was the proper thing to do and was consistent with legal practice.
"Furthermore, having settled
the litigation, it was proper and
customary that our attorneys'
work would not be made available to other plaintiffs, present
or future. These are materials
that no other party has any right

to.
"I should emphasize that Con-trol Data has been trying its own case, not the government's.
While we have fully cooperated While we have fully cooperated with all government requests for material from our data base, there has never heen any understanding that our effort would continue after a settlement. The government's 25-man staff, headed by two distinguished trial lawyers, is fully capable of trying its own lawsuit."

### Like Fine Wine, His 30 With Age **Improves** ouse spooler, called In-increased efficiency by

(Continued from Page 1)
added years of life to our present installation," Decker said.
"Without the 2200, we would
have had to go to a larger system, probably a 370/135 and
compatible remote job entry tercompatible remote job entry ter-minals, at a much greater cost and, we think, with less effi-ciency than with the leased 2200s."

2200."
In addition to the terminals, Day's increased the CPU memory with the addition of 32K from Cambridge Memories. The firm also replaced three IBM 2311 drives with three Pout 2314 double-density drives. "This allowed us to put our customer account master file on line. Decker said." line. Decker said

### Ratio Looks Better

Now the "halance between the book value and the market value" of the Model 30 "is much value" of the Model 30 "is much closer," be said. Decker esti-mates the market value now is about \$225,000 while the hook value is about \$250,000. But the ratio looks better than hefore the upgrade, he said.
"When we bought the Model 30, IBM recommended that we

30, IBM recommended that we amortize the system over a cer-tain period of time. They showed us the payback using one of their famous charts," Decker said

The system was amortized over a nine-year period, and when IBM announced the 370, the 360 was devalued, and its mar ket price dropped, he said.

Decker determined the price of his 360 hy putting out hids and investigating the possibility of upgrading to a 360/40. Based on responses from potential pur-chasers of his Model 30, Decker urrived at an average market price for the system.

While he elected to keep the Model 30, he did sell three of has initial six IBM 2311s and re-placed them with the Potter

The key to increasing the value of his system was the use of non-IBM equipment, Decker said.

### Bonus for User

"We purchased the Potter drives for \$40,000 while IBM drives for \$40,000 while IBM wanted \$96,000 for a three-stack 2314 system," he said. As an additional honus, the Potter double-density drives have a greater capacity than the more expensive IBM units, he added. The 32K of core from Cam-

resulted in a savings of \$40,000

would have paid over \$50,000 for 32K of core from IBM but the Cambridge box cost only \$17,000." Even IBM "secondcore"

317,000." Even IBM "second-hand core" would have cost about \$29,000, he added. With the 64K on the Model 30 the company bas gone to a multipartition operating environ-ment. "We wrote our own spooler which allowed us to get more time on the computer compared with IBM's Power, or

the Grasp package from Soft-ware Design Inc.," he said. Power allowed 16% "more time on the CPU" white Grasp increased efficiency about 18%

tercept, increased efficier 28%, according to Decker. "We use our package to spool and we handle I/O in one partition and our regular processing on the other to get a much better utilization of the CPU."

Two Surfaces

Both Power and Grasp require a dedicated 2311 while the in-house software uses only two

disk surfaces. The in-house package developed by the firm's four-man programming staff has allowed Day's to go from a three-shift to a two-shift operation. The extra time on the 360 is used for cialized m

ing," Decker said. "Our in-house programmin staff also created all the nece stall also created all the neces-sary programs for the terminal system in Databus, the Cohol-like processing language made available with the 2220," noted Decker. "We can make any change or alterations required in

### Quake Data Missina Because of Man

LA JOLLA, Calif. - The use of LA JOLLA, Calif. — The use of computer technology in earth-quake prediction appears to he way shead of man's ability to provide the computer with meaningful physical data.

A computer model describing the way rock formations dilate under stress, used in conjunction

with laboratory observations of rock deformation, could provide "the place, time and even magni-"the place, time and even magni-tude of an impending earth-quake," according to J.T. Cherry, developer of the model and principal investigator in the geophysics and materials department at Systems, Science and Software Inc

### Digging Deep

However, "what is really needed," he said, "are methods for ohtaining strain information for obtaining strain information well below the earth's surface, where the rock is firmly anchored and not moving."

No successful method for accomplishing that has been demonstrated, Cherry said, but meaningful data may be obtained from a technique which involves measuring the changes in the speed of sound at depths a few kilometers below the eve

That data That data recorded over a period of years and analyzed with the computer "dilatancy model" could provide the first predictions of time, place and magnitude of future earth-

### Camel Driver Finds Happiness in DP

ABU DHABI, the Trucial States - Once upon a time in the tiny shiekdom of Abu Dhabi, there lived a man named

Ahab was a camel driver and most of his friends were either fishermen or pearl divers. Life

fishermen or pearl divers. Lite was simple.
But soon oil was discovered and the magic hlack liquid brought many changes to the 50,000 inhabitants of Abu Dbahi and their neighbors along the Persian Guif. Progress and development came in with a rush and, alas for Ahab, cars replaced camels.

camels.

The outlook for Ahah was bleak and the leaders of Abu Dhabi had trouble keeping track of their new-found wealth (\$378)

million/yr from oil alone),

the system ourselves

But from across the wate NCR appeared with a small 500 computer. The magic ma-chine paid the workers and kept track of the inhabitants and their money.

Since then, Ahu Dhabi and neighboring sheikdoms have shed their status as British Pro-tectorates and formed the Feder-ation of United Arah Emistes, And the leaders have sequired as And the leaders have acquired an even bigger machine, a Century 200, so Ahu Dhabi will be able to assist its neighbors.

Life has improved for Ahah, too. He has given up camel driv-ing and learned to operate the magic machine and so far is liv-ing happily ever after.



# M-SHARE Com-Share has no beef with the world leader.

But we do offer the timesharing user something that G. E. can't offer: Smallness.

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# News Wrapup

### County Hiring Biased, DPers Sav

FRING EGORGES COUNTY, M. — Two systems analysis in the county's data processing division have charged that the county denied them pronosions and discriminated against them because they are not "retired military personnel."

In series of hearing, Fern Landhier soul in data secting even they are not "retired military personnel."

In series of hearing, Fern Landhier soul in data secting even hearing the second of the second section of the section

A ruling on the charge is expected soon from the county personnel

### Computer Spots a Hot Ticket at Races

SCHENECTADY, N.Y. – A computer has outwitted one man's attempt to beat the odds at the race track. On bcc. 19, an unidentified man presented to the Schenectady off-track betting operation a ticket that read, "Monticello, Dec. 11, W-8-B-2." This identified a \$2 win bet on a horse lettered "B" in the eighth race – in this case worth \$73.

highth race — in this case worth \$73.

The ticket, however, also bore a computer-generated 15-digit liphanumeric identifier, which is used to check every winning ticket before payment is made.

serore payment is made. When the computer terminal indicated the ticket was not a winner, the man argued the point briefly, then left his name (later found to be fictitions) and went away. OTB officials, after lengthy examination of the ticket, established that the "W-8-B-2" has been peeted from the surface of another ticket and carefully passed in place.

### New Grading Set for Bar Exam Questions

SPOKANE, Wash. - Computer-graded, multiple-choice questions will constitute one day of the three-day Washington State bar examination starting Feb. 26, the State Bar Association's board of

communication and processing the control of the con

### Life Not Quite Over for Life Magazine

Life not Quite Over for Life magazine
NEW YORK, Ny.—Life may end but the computer goes on. On
Doc. 8, the directors of Time, Inc. announced the end of Life
Dec. 2, the directors of Time, Inc. announced the conputer the control of the control of





### Flying...but Not Off the Ground

At Lockheed-Georgia Co. a computer-controlled flight simulator is used to train pilots to fly C5 Galaxy airplanes. An "in motion" cockpit and televised terrain are linked by a Lockheed Electronics MAC 16 minicomputer. Movement of simulator controls by the pilot (left) causes the television camera (middle) to display model terrain on an aircraft windscreen. Plots

"fly" across landscape creating aircraft movements similar to those experienced in normal flights. Here the camera is focused on an island airfield. Material surrounding the island undulates with illumination from a large bank of lights to produce water movement. Flight equations of motion are part into the minicomputer (right) prior to simulation of the produce water movement.

# Paranoid Programmers, You're Really OK

By Michael Weinstein

Of the CW staff

"The average programmer is excessively independent — sometimes to the point of mild paranois. He is often egocentric, slightly neurotic, and he borders 
on a limited schizophrenia," according to Dick Brandon at the 
1968 ACM Conference.

"The conference of the programmer and managers and managers."

1968 ACM Conference. Programmers and managers who were disturbed by Brandon's analysis and sought therapy as a result are advised to take heart since new data has been compiled that suggests that while some DPers may be paranoid or schizoid, the large majority is not.

Personality Profile

One test result cited by T.C. Willoughby of Penn State Uni-versity is the Edward Personal Preference Schedule (EPPS) used

ables or personal preference

Results of this test indicated Results of this test indicated that good systems analysts and programmers tended not to need help from others, were insus-ceptible to opinions of others, liked things orderly, liked to see milestones tick off rapidly, liked to be the dominant person in a situation and did not like to be

While the EPPS results do not describe the average person, neither do they indicate evi-dence of the abnormal qualities described by Brandon, Wil-

Another study the programmer can cite when trying to get a refund from his analyst contrasts interest areas of programmers with the level of psychopathic deviation expected in these

Program ers were found in the upper third of scientific, compu-

CIMS

The Computer Installation Menagement System (CIMS) provides e method to supply menagement with partition of their other tion of their other tion of their other tion of their other tion of their other othe

Accepted by Banks, Aerospace, Oil, Univer-sities, Accounting, and many other firms.

ent System

interests.

Since people with high scientific interests tend not to be paranoid, it follows that programmers should not as a rule be paranoid, Willoughby stressed. The same lack of paranois is found in persons with a high interest in computational and mechanical interests, Willoughby added

added.

Detracting from the programmer sanity theory is the fact that persons with a high interest in music are more prone to schizo-

habha

To counteract arguments based To counteract arguments based on the music-schizophrenia cor-relation, Willoughby pointed out that if programmers really were schizophrenic, they would also rank high in clerical interests since persons with such interests tend toward schizophrenia.

ts show that program a cas snow that programmers in fact rank very low in clerical interests – an insight that will not surprise those who have tried to get a programmer to document his work.

tried to get a programmer to document has with the profesion received this somewhat tamished image, will oughty pointed to the age difference vivors and suggested that supervisors have an "aggressive individualistic" muture of existence while the programmer may be a The evident frustration with the programmer could be due to the different value systems, not rations of the individual, Walloughy stated.

rations of the individual, Wil-loughby stated.

A full report of Willoughby's study can be found in the pro-ceedings of the tenth annual computer Research Conference, available from the Association for Computing Mechinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

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# "We're introducing a major new version of the DP-AUDITOR/CULPRIT system at the computer

caravan and we'd like to give you a preview."

John Cullinane

Version III of the EDP-AUDITOR/CULPRIT systams has a great group of naw features, including important enhancements to the Data Base Management varsions.

If you are a current user, you will naturally get Version III

If you are a current user, you will naturally get Version III fee. This includes those many customers who installed these systems during the past year.

Since most users parformed a competitive analysis of all compasting products before choosing an EDP-AUDITOR or CULPRIT system (in many cases with the assistence of outside consultants) it will be obvious that we haven't added features marely to win a compatitive analysis. The wouldn't be necessary.

Our aim was, quite simply, to give you a tool that really pro-duces results in your installation. As you know, there's a diffarence. In fact, most of these new enhancements grew diractly out of day-

In lact, indeed insee new entand-entents grew diractly dut of day-by-day contact with user groups. Cullinane seminar to be held in conjunction with the computer caravan. We'd like you to meet our key staff membars, such as Jim Baker, Kan Felor, Tom Mourer or Jarry Miller and question them directly about new Version III.

In the meantime, we'd like to ask you to read the following long (but important) list of new EDP-AUDITOR/CULPRIT feetures."

### **CULPRIT III**

- Special forms facility ellows Individual handling for sach report calling for sach report calling for special forms.

  Input record size can now be up Procedure public size has been doubled in size allowing more procedure peremeters to handle very complax reports.

  Well organized and easy to read imput peremeter listing Table took up.
- SPECIAL CULPRIT MODULES
- Peremeterized file metching (user specifies size and location of keys at run time).
   Index sequential random read
- intex sequence routine.

  IBM-DDA file match and expension modules which are valuable to benks using IBM's Demend Deposit Accounting System.
- Redefinition of output lines to allow greater output format flexibility.
   8-cherecter field names for improved dete dictionery.
- - mproved oser actionery memonics.

    New "O" Permeter greatly simplifies certain calculations at total time releted to values accumulated at input time.

    All Assembly Lenguage coding eliminetes COBOL modules and reduces core requiraments by 3K.
  - or reeding GE 400 tapes directly on IBM computar.

    RCA 301 Series tape need module for reeding RCA 301 tapes directly on IBM computar.

    VISAM files reed module.
    Label output module which projuces 2, 3, 4, 5-up lebels simple.

    Splitter output module permits

- Occurs repetting sagment module which handles Occurs or Occurs Depending On segment types.
   GE 400 Series tape read module
- the spacification end printing of any number of linas from a single record.

  Bit-testing module.

### DATA BASE MANAGEMENT VERSIONS

- IMS/CULPRIT

- User may provide SSA's to allow selected segment retrieval or to eccess segments randomly.

  8.192 byte segments or segment strings allowed.
  Access two or more IMS flies et the same time.
  Access non-IMS flies during en-
- RDMS/CULPRIT

- RDMS/CULPHII
  Information available from the
  Control, DATA, and XREF portions
  of RDMA records.
  In of Comparison of Compressed format data fields to any
  aize desired by the user.
  Emoloys cataloguing feature elimfield in regord perameter ceeds.
  Processes a virtually unlimited
  number of strings through the
  death size.
  Gets base.
  Reads instell driving file in a string
  Reads instell or in string.
- TOTAL/CULPRIT

- TOTAL/CULPRIT

  Information available from the
  entirs TOTAL record including
  root and infrage segments.
  eliminating the record of the record
  eliminating the need to define
  togical fields in report peremeter

  Processes a virtually unlimited
  number of strings through the
  dete bass. Each string may be
  for the record of the record of the
  processes a virtually unlimited
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  processes a virtually unlimited
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  other reads and elicet.

- IMS run.

  Accass HDAM, HIDAM, HISAM files, physicel or logical.

  Enhanced deta dictionary capebility.

  Also includes ell feeturas listed ebove under CULPRIT.

- either directly or sequentielly. All other reeds ere direct.

  Direct reeds can be based on Drest reeds can be based on Drest reeds can be based on Drest reeds can be based on Leving Common of the Common of the Common of Common

- Direct raeds cen be based on keys submitted by users and or keys read from a non-1701A, filiar, of verteble chains handlad euto-metically by the system.
  Hendles multiple inkeges between a mater and/or vereble organization).
  Access all pipes of files.
  Includes all sastures listed under CULPRIT section.

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### Computers and the DP Employee - Part II

# Trainees? There's No Shortage in the UK

By Joseph Hanba

SONDON Set in Computer word stiffying more
with DP than with their firms and are finding their
career prospects originarily within DP. Thus the
chances of moving out of DP into company mainThese conclusions come from a report entitled
"Computers in Offices," released by the UK DPpartnered of Employment. It is based on informapropriet of Employment. It is based on informaformation of the propriet of the processing to the
According to the report, the specificular demand
will never return, despite the end of the recession.

will never return, despite the end of the recession
get worse, but there is no shortage of trainer. get worse, but there is no shortage of trained start and it will get worse, but there is no shortage of trainees. In the typical user installation, the staff ratio for each DP manager (or assistant) is 3-1/2 systems analysts, five programmers, four computer

operators and 11 data preparation employees.
in service bureaus, software houses and manufacturers' customer service departments, the proportion of programmers and analysts is con

siderably higher. The ratio will remain about the same for the rest of the decade, the report said, except for data preparation staff which will slowly

The growth of DP office jobs will be a steady 17,000/yr, including i,000 additional DP managers, 8,000 programmers and analysts and 4,000

Data preparation personnel now outnumber DP managers, systems analysts and programmers combined, but because of key-to-lape, key-to-disk and OCR, the number of data preparation employees will increase only by 2,000/yr, the report pre-

# The internal growth of DP jobs will be the m

opportunity for advancement, the report said. There will be a 60% increase in DP jobs at all levels in the next six years, and most of these jobs will or by moving up staff now in the firm but not yet in DP.

On the other hand, the chance of mov-ing up and out of DP is shrinking: two-thirds of all DP installations reported that DP staff had either a "poor chance" or "no chance" for career opportunities out-

One reason cited by the report for the lack of people moving into management is that DP salaries are still relatively higher than those in the rest of the company. "To be moved from DP to an executive post outside, an individual might need the equivalent of two promotions to retain his current salary scale. the report declared.

### Source of Staff

The report also discussed the source of new DP employees. Of newly appointed DP managers, 28%

moved up to the job from within the firm's own DP department and 29% came from elsewhere in the company; the re-mainder came from DP departments of other companies, the survey showed. Of newly hired systems analysts, 41% were already fully trained and came pri-

marily from other firms. The remaining 59% were hired as trainees, with twothirds of that group coming from within the firm and the rest from college Newly recruited programmers were di-vided equally into three groups: pro-grammers from other firms, trainees from

within the firm and trainees from outsid Computer operators were hired almost entirely as trainees, slightly more often from outside than inside the firm the

New DP managers were trained mostly by the computer manufacturers. Pro-grammers and analysts were trained by grammers and analysts were trained of manufacturers almost as frequently as they were trained in-house. Operators were

Commercial computer schools provided virtually none of the training, according

to the survey. Despite the large number of trainees hired, the report warned that there was "no general shortage of trainees." The

relatively long time it takes to train staff – nine months to two years for a programmer or analyst, according to the survey - means many firms are looking for trained staff. The report said there will be an increase

The report said there will be an increase in the demand for trained staff, resulting in a "abortage of highly skilled experienced personnel. What is especially important is that computer users should import that it is especially important in that computer users should be considered to the contract of the contract of

82% are on shift work and 55% work

Sixty-nine percent of all installations have programmers on overtime, and i% of all installations (3% of the large ones) have programmers doing shift work.

Pourquoi est-ce que je dois changer de langue? Il ma pris dix ans pour apprendre celle-ci.

Wie komint es dass der Preis des EDP ist immer höher und höher?

Obsoleto? Vengo di comprarlo!

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### Editorials

### Part of the Pattern

The acquisition of the Service Bureau Corp. by Control Deta was one of the most unexpected computer community events of the decade. The news of the transfer. as a part of the settlement of the suits between IRM end Control Data, was mostly greeted with shocked silence. The differences in style of business in the equipment used, and even the neture of the business thrust of the two corporations seemed about as far enart as is possible

for two firms in the same computer community. Yet, the pattern can be seen emerging even before the lewsuits wera filed. Control Dete, during its decade-plus of existence has elways had an interest in eccuiring companies that seemed a little fer afield of its immediate

In the early days this involved technical compenies dealing with the peripherel units that would surround the mainframes it was building - Rebinow Electronics, for one

Then came the jump into computer schools, end scientific computer use, with the Ceir merger which also brought the Automation Institutes under the Control Dete banner. The Commercial Credit acquisition a few years leter elso was part of the pattern - and also was a little for ofield

Looked at this way the acquisition of the Service Bureau conforms to the Control Deta philosophy and history. Strange today, it may well appear to be the most netural thing in the world tomorrow.

### Fearing the Computer

Retailers are moving further end further into the computer world - fortunately confined to business applications. Those reteilers who have harnessed the computer are grateful for the contributions to profit made by a good system

But, they must elso look at the bad that can be done with e computer. Nobel created the Peece Prize because he hated the thought of the demage that could be done by his invention, dynamite. We may some day have e Thomas J. Watson Peace Prize.

Key men in the U.S. Department of Housing and Urban Development recently reised the question of the application of computers to projecting the social conduct of individuels - and the impect that such e development could heve on our justice system.

They point out that our justice system is besed on the concept that the individual has will power, so that if deterred, punished end rehebiliteted, he will no longer conduct himself as e criminal. But these two men. James W. Evens end Robert A. Knisely, cleim that computer profiles will soon predict "with startling certainty" which criminals are unlikely to respond to eny rehebilitation effort

They say: "By examining the records of many prisoners end habitual offenders, the computer may make it inescapebly clear that elthough one cannot predict with total certainty the fact that any individuel will remein e criminal, the probabilities are so high as to raise e presumption that he will "

Thus, they ere pushing predictive enelysis by computers to identify criminals before they commit the crime - and to identify those whose profiles indicate that they cannot be rehabilitated. Society, they say, should isolete such people before they do anything wrong

(Reprinted by permission from Retailing Today, December 1972)



### Letters to the Editor

### Recognize Individual's Wants Before Group's

I have followed with mixed feelings Alan Taylor's attempts and those of others to force recognition of groups. These groups run the gambit from antiwar to pro-religion. I am as-tounded that the simple powers

of observation are not utilized The DP person has been comred to lawyers, doctors of professions, but apparently no one has canvassed the layman to find his opinions of the value of CDP, SCDP, ACM, AMA, AFL-CIO, etc.

personally believe the layman today selects his services ducts, entertainment and the like hased on the individual, quality and price instead of the organization(s) that support these services. Since all of us are laymen to some degree, hasn't the time come to pull our heads from the sand and consider these

H I Pohinger

### SS Number Abused By Administration

A Social Security Number XXX-XX-xxxx could be used as an identifier, except that the numbers have been abused, ever by the Social Security Administration which never seems to check to see if a person is entitled to a new one

Just as two digits, "XX," give 0<sup>2</sup> - 1 = 99 permutations, the nine-digit Social Security Num-ber possibilities = 999,999,999 But this is not enough for the U.S. population if we all ask for different social security numbers in the hopes of increasing our benefits, and lowering the Internal Revenue bite. And therefore, Computerworld ought to expect that there may three or more people holding the same Social Security number.

It might not be enough to sug gest an alphabet sort, nor ever one according to address ( we are somewhat free to use as many names and addresses as seem to be needed). I am afraid the Social Security Number will have to go on the butt at birth (or with immigration), But we will

have to agree on which side it should be, so that nobody can show but one when he has two Richard H. MacCutcheon Cleveland, Oh

### Software Vendors Get No Revenue

Alan Taylor's statement [CW, Dec. 27/Jan. 3]that because of spooling there is "no excuse" for forcing a single form to serve multiple purposes is theoretically correct. A practical consideration, though, is that the IBM-supplied DOS spooling package does not support multiple printers (real or virtual) from single partition.

Whether this was a design over sight or a design objective to ensure that the sale of additiona printers and control units was not impacted is certainly an interesting question

The fact remains that non-IBM spooling systems support multiple printers from a single parti-- and the vendors of this software get no revenue from printers

Kenneth W. Kert Vice-President Software Design Inc.

### Government Has

No Place in Industry It's getting near the time responsible members of the DF industry had better wake up to the consequences of the policies being advocated by some of our

The pages of the DP trade pub lications have contained, in renumber of articles letters and news reports concerning the need for more and more regulation of our industry by govern

We're not meeting our "social" responsibilities, says one; our antitrust laws are inadequate says another; let's get the UN involved (God forbid!) says still another. In the Jan. 10 Com-puterworld, Messrs. Güchrist and Vessel suggest that "perhaps the best way the country can manhence make sure it is used for the public good is to . . . . "

The way is unimportant con-

sidering the much more fur mental issue involved in their on that it is th country's (i.e. the Federal Gov rnment's) proper function 'manage" (i.e., regulate, control) our industry.

It is a fundamental precept of our American way of life that government exists solely to pro tact the rights of individuals To protect our individuat rights to life and property, not to abridge them or regulate them, is the essence of freedom. The "pub-lie" or "society" is a non sequitur, a non-entity, since it is, in reality, a collection of indivi-duals. In short, the government has no right to manage our industry in any way, shape or

Robert L. Sullivan Cumbridge Mas

**Bad News for Cobol** This January I'll be starting an informal newsletter devoted to the question of a Cobol replacement ment language. Anyone who would like copies should send

me his or her address and the umber of copies desired I would also like articles or letters of comment that anyone will be willing to send to the newsletter. It is informal and materials do not have to be thesis-level things. Just things that you'd like to get out for

brain-storming and playing with. The title of the monthly is New Business Language. Subscription is free, until notice, but a bunch of stamps will be appreciated. Los Celko

Box 11023 Atlanta, Ga. 30310

### Bits. Bytes Revisited

In the Aug. 16 issue of Com In the Aug. 16 issue of Com-puterworld, a letter by Tom Gilb, entitled "Byte vs. Bit Con-troversy: Rules of Thumb In-adequate," referred to "Record Compaction Techniques," 8582 IBM Form E20, IBM states there is no such form

A.B. Tonik Sperry Univae Blue Bell, Pa.

The correct identification should be E20-8252. According to Gilb, this publication was ob soleted in 1969. Ed.

# <u>Learning to Read Printouts</u>

# DPers Would Do Well to Set Up Quality Control Plan

very confusing, particularly when they contain information with which the reader is not familiar. This fact probably exmanagers shy away from using

printouts to The Taylor obtain in-Report

systems. These managers do not real ever, how easy it can be to learn to resd a



obtain innation about the quality of their equipment and the stan-dard of maintenance it receives. The cost in computer time is about 5 min/day, and the results can be simply graphed to show trends of failures.

Setting up the quality control system is quite simple. With the cooperation of an operator and a maintenance engineer it takes about one hour

If the maintenance man is un is too verbose and tries to blind you with figures - you may have to dig into the manuals, or find someone else who has a background in the maintenance This is not more than a half-day investigation.

The place to start is in the diagnostic programs - and with

a clean set of tapes. (This is important, I recommend keeping one set of tapes particularly for this operation, and having them numbered so you always know

what tspe is on what drive.)

Run the diagnostic, generally
until the first break in the program. This usually takes about three minutes. Now, unless a bad three minutes. Now, unless a bad problem has been found you can unload your tapes, put them away, cut one small table from the operator's log and paste it

The daily work is over. You low have all you need for complete quality control.

In the case of many DOS u the table will often look like

### For the Common Man

Most of the information is not necessary to the quality control system. The first column is simply the reference number of simply the reference number of the various units written in hexa-decimal. (Don't expect these printouts to be written for the DP manager. These are written in maintenance man's jargon which isn't really too hard to

Hexadecimal is simply based on a count of 16, instead of 10, so that 100<sub>16</sub> is around so that 100<sub>16</sub> is around 250 - and eight (not five) is the half-way point. (That's all I re-member and I get on fairly well.)

The second column shows an abbreviation for each of the read unit, PU the punch unit, Simplified Estimated Fault Log

The next two columns under the together. The set of numbers on the left under OPER (number of operations) is filled in only if any failures have been noted. The second set of numbers, labeled FAIL, indicates the num-

Again the figure is in hexa-decimal. Sometimes you do not have to bother to convert the numbers - since the numbers are the same in hexadecimal ss decimal. The reader had four failures in three minutes of operation, while tape 181 had seven. Tape 280, however, had 16 errors – although it's printed

One problem with many diagnostic aids is that they only count up to "FF" and then give up. FF is a code meaning "more than 256" but really indicates how badly the device has re

### Testing Report

By now it can be seen that the word BLOCK really means "groups of tests performed." It comes from the number of times the program has passed through the block of coding which sets up and evaluates the tests.

There are three more columns to be examined. The first. headed ACUM STAT (Accumucumulator Status), is simply a 16-bit report of the super-imposed status words that were sent back by the unit when it



### The Diagnosis Is Clear

Table 1. The table represents the results of a diagnostic routine after a three-minute test. It liks the number of fault conditions noted in each of the system units during the test period. The contents can be used to provide the DP manager with a graph of the probable number of faults per day, and readings from the graph can indicate the cases of gradual degradation of performance quality.

reported an error. With the aid of a reference pamphlet, you can discover that tape unit 181 reported the evice End" status on at least one of the seven times it failed. and that it reported "Channel End" at least once. But you cannot tell whether or not it ever reported both Device End and Channel End at the same

In fact, only one of the bits is important for quality control purposes. This is the second bit of the left-hand byte (0200). This bit indicates there has been a unit check and that is all you really need to know. In fact, you will find that you do not even have to bother about that bit.

The last two columns are im-portant, however. Blank entries regarding the number of test cycles run and the numbers of reported always mean ere were no errors reported.

But this can occur because the units were not tested, as well as hen the tests were successful The last two columns differenti-ate between the two situations. Units that are marked by "X's" in the NOT RDY column column

### Flags Make It Easier

The final part of the printout is the flagging asterisks on the left. These indicate the units which were tested and which produced failures. These are effectively equivalent to the one out of the 16 bits in the Accumulated Status item. So we need only look at the asterisks and can ignore the ACUM STAT figure In fact, with a bit of reorganization, we now have a list of units tested and a list of errors found in a three-minute test. The three minutes, of course, do not represent continuous opera-tion, any more than normal

operations are continuous.
The test, however, does repre the test, however, does repre-sent roughly between one-quarter and one-half of 1% of a day's operations. Therefore the estimated number of daily errors can be calculated by multiplying the number in the FAIL column by 200 if you have a one-and-one-half-shift operation, or by 400 if you have a round-the-

Now you have your quality-control figures ready for graph-ing. As IBM says in its publica-tion, the Midas (Modular Isolation Diagnostic Analysis System) Self Study Seminar: "Through the periodic use of Midas . . unit degradation can be spotted

prior to its becoming a major Of course, it is talking about the amount of time its CEs will take to handle the eventual

lems begin before that. So the advice is just as good and perhaps needed more by user management than the CEs. So why not give it a try? It will

help you, your staff and your And it only takes five minutes

a Gay.

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# 400

The figure shows a simplified estimated fault log of the type that can be used by DP managers to keep track of the quality of their installations. All the information is obtained from the type of information included in the diagnostic record printout, illustrated in the table. The figures on the left show the hexa-

decimal number of errors which appear on the printout, while the figures alongside show the decimal equivalents, multipled for a 10-hour daily running time. The multiplication factor used was 200. Entries are made for each day, with the Monday figures coming from

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# Carefully Planned Computer Selection

# Was Sandbaaaed on Corporate Ladder

And the CMA team sat back to

Something Hannening

But something unusual was happening here. The CMA team did not study available hard-ware and confine its require-

Viewpoint

the marketplace. It concentrated

to the vendors to decide what to

pull off the shelf or the drawing board to statisfy those requirements. In some ways this seemed idealistic, But that part of the CMA project worked.

Each vendor who responded picked something from his real-world offerings, or soon-to-be

real-world offerings. And al-though the offerings didn't sat-

struck an ontimum compromi

itv.

between requirements and real

Rating the Requirements

As the bids came in, the CMA

team shifted gears and devised an elaborate evaluation scheme

for breaking the bids down into measurable results. It as-

signed weights to the various re-

all the requirements, they

By Miles Benson

Speciel to Computerworld
Company T had a problem.
The old computer, one manufactured by a well-known company which dominates the company which dominates the com-

puting field, was scratched. There was no way it could solve the corporate problems in the months ahead. It was time to replace the current hardware.

The firm decided to do the job right. It picked a team of te

nical people to make the new size the breadth of the project, it adopted a more inclusive adopted a more inclusive name - Computing Moves Ahead (CMA), And the selection team had full rein

### How to Select

How does one go about the task of computer selection? task of computer selection? Every installation – and every manager – has tried to do the job the way he thinks it should be done. And very few have come up with the same solution. The CMA team decided to The CMA team decided to cover all the parameters and spend as much time as necessary to do a thorough job. With several million dollars of expenditure ahead, spending a little extra on selection seemed

First, the team analyzed the work load and determined what kinds of jobs it had, which were I/O bound, which were core bound and what that meant in

erms of requirements. Then the team surveyed the future work load and polled cur-rent users, and potential users, trying to get a handle on pro-

jected requirements.

It studied the impact of conversion, and possible aids for conversion, based on where they were and wanted to be. The team analyzed software requ ments, extrapolating present language usage to future language usage, and present utility program usage to future utility usage, and defined those needs.

The team looked at computing trends and research-produced predictions for future developments, and added those require ments to the total picture.

With all of this survey material in hand, the team defined the CMA needs. Out of the needs a specification of what nd of computing facility ould satisfy those needs.

The specifications were then exposed to the Company T world. Management and techni-cal people alike got a chance to e the specifications and criticize them, and bend them to scores into hopefully meaningful be more realistic. And out of totals

this test bed came a more sound, Many people pointed out that more real set of specifications. weighting schemes often turned out to be supersensitive to the more real set of specifications.
The time had come to move
CMA outside of Company T into
the competitive world. The specifications were sent to various
wendors and bids were invited. arbitrary weights assigned. And so the CMA team conducted dry runs on their weighting and scoring scheme, checking it out for

dability. Finally, all the bids were in, and all the evaluations had been run. And a clearcut winner had been established.

The CMA team made a formal presentation to management. It described the approach, reviewed the analysis and proclaimed the

And then a funny thing hap-pened. CMA's choice, a brand B computer from a company just breaking into the large computer field, didn't get ordered.

Cost-Conscious?

For a while, nothing got or-dered. The CMA team rationalized that the delay was simply corporate bureaucracy mixed with cost-conscious caution Not for the brand B machine But for the latest giant from the well-known company which dominates the computing field.

It never was fully explained to It never was fully explained to the CMA team why the carefully created advice was ignored, and vendor reliability, and some other factors which the team though it had covered in its anal-ysis. But nothing satisfying to

ysis. But

Only the nagging feeling that the issue had really been re-solved, somewhere up the cor-porate ladder, before the work had begun.



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# January 31, 1973 Computerwords SOFTWARE&SERVICES

### Random Notes

### DOS/360 Utilities Undated To Run With 370 and 3330

LOS ANGELES - DOS/360 users moving over to 370 systems with 3330 disks can utilize updated versions of two

disks can utilize updated versions of two packages from Associated Computing Ser-vices Inc. (ACS) on their new equipment. One, still labeled Relo/360, enables DOS/370 users with 3330s to store their application programs in relocatable form. The updated DOS/Audit package, on the other hand, inserts a date field in the source statement library whenever a change is made in a company.

change is made in a program.

Each of the new 370 packages is installed by mail, ACS noted. Each costs \$1,200, and can be ordered from 12011 San Vicente Blvd., 90049.

### Nova, SPC-16 Cross-Assemblers Set to Run on Many Mainframes

SAN DIEGO - Programs for Data General Nova or General Automation SPC-16 minis can be developed on various full-scale CPUs with one of two cross-

scale CPUs with one of two cross-seemblers just released by Decision Science Inc. (DSI). DSI-Nova accepts basic Nova Assembler Language while code, for the SPC-16 source code, for the SPC-16 surface Each is in Fortran IV and can be in-stalled on any Fortran-supporting mair-frame. The 360 version should fit in 32K bytes, DSI said. The Nova neckage costs 1,500 and the SPC-16 S2,500, from 4508 Mission Bay Drive, 92109

### User Shapes Ledger Reports

BURLINGTON, Mass. - Users of Software International's General Ledger sys-tem, previously limited to a set of "hardtem, previously limited to a set of "hard-coded" reports, can now specify both the content and format of their printouts, at execution time, with a control-card-driven report writer feature added to the

The parameter options include layout of The parameter options include layout of both columns and rows of information headings, titles and types of calculations to be performed on data before it is reported. The enhanced ledger system in ANS Cobol, operates under DOS, OS or IMS/360, and is available from 279 Cam-bridge St., 01803.

### Loan System Extended

CHERRY HILL, N.J. - Loans made on CHERRY HILL, N.J. — Loans made on a simple interest basis can have interest caiculated on daily outstanding balance with an optional subsystem now available as part of the Bankser/ Installment Loan System from Arthur S. Kranzeley & Co.

Written in ANS Cobol, the complete system, including the simple interest pro-cess, can be installed on IBM, NCR or Burroughs CPUs. The 360/370 implemen-tation requires 120K bytes of storage. The system costs about \$35,000 depending on customization needs. Kranzeley is at 1010 S. Kings Hwy., 08034.

### Standards Doubtful

# TG 13 to Study Benchmark Techniques

WASHINGTON, D.C. – Better under-standing of methods to define workloads, benchmarks and test procedures, rather than standards to be followed in those areas, are the likely results when a still-forming task group completes Its basic work for the National Bureau of Stan-

dards.

Task Group 13 is being organized under the Federal Information Processing Standards (Fipo) Coordinating Committee, but experience may show that required standards of operation "simply are not suitable" in the areas to be studied, according to TG 13 Chairman Oliver Kinney of Mitre Corp.

Since benchmarking "does not have the Since benchmarking" of the Since Senchmarking of

outside commercial support that is available in the simulation systems and hardware and software monitor area, it ware and software monitor area, it appears deserving of a dedicated work group within the Federal Government," Kinney was told in his preliminary in-

structions.

Though TG 13 will, in part, serve as an interagency "forum and central exchange" of methods and problems, both kinney and Dr. Joseph Harrison, chairman of the NBS Fips Coordinating Committee, expect the group to seek relevant information from users both in and out of the government and, similarly, to make its findings available to the broadest range

of interested users.

The precise "charter" for the new task group is still being written, but Kinney has been asked to gather material on the problems of workload definitions and

NBS has also said TG 13 should identify

and design "technically accepted method-ology, criteria and procedures" for benchology, criteria and procedures: for benchmark execution in the measurement of both computer systems and time-shared services. That part of the work should include test data and monitoring requirements, according to Kinney's instruc-

tions.
Finally, TG 13 should prepare federal uniform "practices or standards" for Fips Coordinating Committee consideration, Kinney was told in early December.

Workloads are just that — that actual work a computer system is to perform, in terms of instruction mix and the like. Benchmarks are tests in which workloads in one form or another are put on actua computer systems to see how they per-form, and these tests are often used to

urations.

Synthetic programs, Kinney explained, are nonproductive patterns of instructions which represent in ministruct the instruction mix within a workload. They are not simulation models although they share with simulation the ability to get results quickly. At Mitre, Kinney noted, a synthetic program representing a month's work on a mainframe ran in three seconds, with worthwhile results.

Inclusion of concern for methodologs inclusion of concern for methodology to test the cost-effectiveness of time-shared services has been cited by one industry observer as potentially one of the most significant elements for the new task group study, especially in view of understanding of what some of the available. actually cost

Kinney's detailed definition of what TG 13 will do should be ready for review by the Fips Coordinating Committee at its

# \$49 Modules Save Record Space, I/O and Data Transmission Time

SOUTHFIELD, Mich. — A pair of 300 Computer Service Corp. (CSC) which usembler Language modules, called datum 42% awings in space needed, after dispersed from the control of the control o Assembler Language modules, called Squeez/Unsqueez, costs only \$49 but may save users considerable space on disks or tapes and time in I/O or data

disks of tapes and time in I/O of data transmission operations. The modules compress and expand char-acter data containing strings of three or more blanks. They are available from

Compressed records not only take less storage space, the company noted, but can be passed through 1/O and data transmission operations faster than full-length records. Some processing time will be required, however, to perform the compression and expansion operations.

pression and expansion operations. The modules can be accessed through CALL statements in the user's Assembler, Cobol or PL/I application program. The same parameters are passed for both modules and include a count field to show the length of the data in the sending field; the name of the sending area; and the name of the receiving area.

Data is compressed by the Squeez module whenever more than two blanks module whenever more than two blanks are found. At that time a flag value of hex 'FF' is inserted in the outgoing data, followed by a one-byte count indicating the number of blanks (minus two) elim-

Squeez will not perform compression if it finds a hex 'FF' already in the in-coming data. Conversely, Unsqueez reverses the Squeez operation as it finds the

The combined modules require only 1,200 bytes of storage for coding. I/O area size is determined by the user.
The package is available from 23225 Northwestern Hwy., 48075.

# 'Pass' Adds Personnel Process To User's Own Payroll System

KING OF PRUSSIA, Pa. - IBM 360 users currently operating with simple payroll systems can extend their opera-tions with the Personnei Accounting and Skills Search (Pass) system from International Systems Inc.

Pass is used to create and maintain a

Pass is used to create and maintain a data base of personnel records, including current status and history of all em-pioyees. An interface between preexisting payroll systems and Pass will be provided by International, a company spokesman

### Continuing Story

Current status fields within the Pass files are updated, through the interface, when-ever a change is made in the payroll files. Pass also provides for the insertion of parrative comments which become part of the history segment of the Pass file.

The personnel system produces a variety of management reports including saiary/ performance review notices, seniority list

ings, status and history, sick days register and Equal Employment Opportunity

(EEO) reports.
Two levels of search are provided by the system, according to the company. One level allows a search of the data base for single- or multiple-skill codes. The second allows a comprehensive search based on various parameters such as education,

various parameters such as education, saiary range and years of service. The Pass logic is written in Cobol and source code is distributed so users may make modifications. As shipped, it re-quires a minimum of 20K bytes of core,

quires a minimum of 20K bytes of core, but may gain in efficiency if more core is available, the company said.

The system operates under either OS or DOS and utilizes three tapes or two disks. The package costs approximately \$10,000, depending on the complexity of the programming needed to interface Pass with the user's payroll system.

International Systems Inc. is at 150 Allendale Road, 19406.

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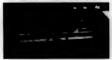
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b) leased lines/broadband
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a) communications processors
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a) memories b) other peripherals

The





Forum Attendance is limited

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### OPEN SESSIONS

New for this year, we'll be conducting open sessions each afternoon for anyone who wants to attend. Each day at 2:30 a different subject will be opened up for discussion and controversy. Here's

Day 1 - Data Communications Planning Day 2 - Software Evaluation Panel Day 3 - Small Systems Panel

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The expanded Exhibit Floor will be open from 10 to 6 each day. A variety of leading companies will be there will be the red seen as earlies. And you'll have plenty of time to look everything their interests you. If a ne scellent opportunity to sits yaheed of this flast-moving industry. And if you have to make decisions, you should be there. (Avience registration is not required for the Exposition.)

# January 31, 1973 COMMUNICATIONS

# Data Briefs

### Western Telecommunications Starts Its Data Service

DENVER - Western Telecommunica-tions Inc. has become the second special-ized common carrier to offer data ser-

ized common carrier to offer data services. The firm's first circuits provide high-speed data links to Cubic Corp. for a classified government project. The circuits, operating between San Diego and Yuma, Ariz, include a 100 kbit/sec channel and a 50 kbit/sec channel and a 50 kbit/sec channel. The higher-speed facility is "believed to be the first 100 kbit/sec service or the first 100 kbit/sec service or western Telecommunications." Western Teleco

western rescommunications.

Cubic Corp. is utilizing only a portion
of the Los Angeles to El Paso, Texas,
route which the FCC recently approved
for the specialized carrier.

### Century 50 Gets RBE

DAYTON, Ohio - NCR has developed a Remote Batch Entry (RBE) package to allow the Century 50 to operate as a satellite processor to larger non-Ncr systems which use binary synchronous

communications.
RBE will allow the 50 to operate with
mainframes supplied by IBM, Univac,
Burroughs and CDC, the company said.
In a network operation the 50 will
"retain its independence as a separate
processing system handling local applications when necessary, NCR said.
The software is loaded via a card deck

The software is loaded via a card deck and control is exercised through inquiries printed on an I/O writer. The package is free to Century 50 users.

### **CSMA Seminars in Five Cities**

WILMINGTON, Del. - The Communiwilming IUN, Del.—Inc Communi-cations Systems Management Association is planning a national series of seminars dealing with user selection techniques of data and other communications equip-

The one-day sessions will be presented in New York, Philadelphia, Washington, Chicago and San Francisco between June

25-29.

A package of speeches from the CSMA conference held last year in Chicago is available for \$10 from the association. Information on CSMA activities is availom Suite 1003, 1102 West-Street

### Terminal Combines Visual, Inquiry COLMAR, Pa. - The CSI Model 180B

Visual Display/Data Inquiry terminal from Credit Systems Inc. is designed to replace telety pewriters or CRT terminals

The \$250 CSI terminal features a 16-key data entry and inquiry keyboard, an 8-character display screen for verifica-tion and responses to inquiries, and nine tion and responses to inquiries, and back-lit panels for frequent responses. Delivery is 90 days from Route 309 and

### First Users Say

# 3705 Application Software Inadequate

Of the CW Staff
NEWTON, Mass. - First users of IBM's
3705 programmable front-end processor
are finding software implementation are finding software implementation often takes considerably longer than ex-

pected.

The amount of time required to integrate a 3705 into a teleprocessing installation is apparently related to the amount of field-engineering support which local IBM branches can provide for the user.

Pending availability of the Network Control Program (NCP) for the 3705, present users are operating their front ends in 2705, emulation mode. But many users will not be able to switch to the NCP, unless IBM announces NCP support for applications software.

"We're in the throes of getting the 3705 off the ground," one user with a 370/155 said. "Up to now we are not too happy about the support," he said. The field engineers are trying to help us but I am not great has have all the argument.

on they have all the answers.
"I didn't really think the education was what it should have been. We went to a one-week 3705 emulator class and the available documentation was inadequate," he said.

quate," he said.

"The 3705 is not as reliable as the
2701," according to Bruce Armour, sys-tems analyst at the University of South-ern California. "We have had channel interface problems which cause checks on the multiplexer channel," he said. It took

problem.

The frontend is connected to a 370/155 and the channel checks occurred when the 3705 was interfaced with the mainframe. A field modification had to be installed, he said, to eliminate the channel checks.

USC is running binary synchronous de-vices on the 3705 at speeds up to 50

kbit/sec, Armour said. At Mitre Corp. a 3705 has b with a 155 since last July, according to Jim Hanks, systems programmer. "The Jim Hanks, systems programmer. "The thing has been incredibly reliable. We did have some minor 'glitches' in the imple-mentation process but we were in produc-tion the following morning."

tion the following morning."
The 3705 replaces a 3702 and "for the same money we have also been able to implement two high-speed RE lines with Hasp, he said. This was done just by 'genning in' He 2701 characteristics into the 3705. It would have cost about \$800, mo more to have the same capability without the 3705, he said.
The 2702 was handling about 23 lines of 2741 terminals and TTYs. These were all switched to the 3705 in one evening.

all switched to the 3705 in one evening.
At first the TTYs did not work correctly.
"When we typed in Log On, Carriage
Return, the line would drop," he noted.
The reason was that TSO issues a Read
chained to another Read instruction, he

read when it is ready to write back the

Pacific Communications Co., Western Telecommunications Inc., Eastern Micro-wave Inc. and the independent Data Com-munications Manufacturers Association

all filed objections with the commission

"But their logic was, given a Halt I/O, the intent of the host CPU was to hang up the phone line," he explained. But IBM experts figured out a correction in about an hour.

The 3705 emulator also m

The 3705 emulator also mishandled the Attention interrupt and was feeding two Attention instructions into TSO. But IBM field engineers fixed this "non-crippling" problem in about a month.

The NCP will require "a substantially larger" 3705 than the 16K model now larger" 3705 than the 16K model now installed, Hanks indicated. "A casual IBM estimate at a recent Guide meeting indicated about 90K would be required to allow adequate buffering," he added. This would make the 3705 about twice

as expensive

"We've had far worse support from IBM in Raleigh with Tcam than we have with the 3705," Hanks said. "We were running the 3705," Hanks said. "We were running level 1.1 Team and in going to release 21.6 of OS, we put in level 4 Team, and that was terrible. We had to back up to level 2 to run TSO, and they haven't fixed the problem yet."

The university has no plans to switch from emulation mode to the NCP because IBM has not announced any application programming support, he added. At present the NCP can support only the Telecommunications Access Method.

"There is no way for us to go to NCP,"
Armour said, "because we want to run
TSO under NCP." But that means we
have to go to VS2. The university is
planning to upgrade to a virtual memory
370/158, but in order to use the NCP the
present jobs would have to run under

"We are stuck because the 3705 can run only with NCP or the emulator," he said. But USC also runs Hasp and APL and these are not supported under the NCP. The only thing that will work with the NCP is Tcam, so only the programs that interface with that access method will operate with the NCP, he added.

One West Coast user is seriously considering replacing its 3705 with an independent processor. "We're keeping the 2703 we use to run production jobs because we are a little queasy about the reliability of the 3705," he said.

"All IBM has done so far is bring up a few ports at night to try out the Tcam. That seems to work okay but most of the problems have been with the Administra-tive Terminal System (ATS), which is so very primitive in the way it handles com munications," he said.

munications," he said.

The independent front end being considered is the Comten 3670, which is 3705-compatible, the user said. "They will have emulation, NCP and an operating system that will allow the two to coexist," he said. This will be extremely useful for users who can run ATS under emulation, and TSO under NCP, he said.

# New Carriers Hit AT&T's DDS: MCI Schedules Intercity Charges

WASHINGTON, D.C. – Competition between AT&T and the specialized common carriers appears to be heating up. The specialized carriers recently filed vigorous objections to Bell's application to introduce its Digital Data Service (DDS) and Microwave Communications inc. announced intercity prices that swering up its 04% less than comparable

A 161 rates.

Six specialized carriers have filed objections to AT&T's DDS applications – led by Datran which told the Federal Communications Commission that Data Under Voice (DUV) and DDS are designed "to extend Bell's" monopoly into the field of data communications."

### 'Damn the Public?'

Damm the Public?'
The parameters and services proposed by AT&T are nearly identical to Datran's plans and are an attempt by Bell "to enter the data market before the specialized carriers, regardless of the public interest... to preclude competition in the data communications" area, Datran told the commission."

In addition to Datran, MCI, Southern

all filed objections with the commission.

In a related area, MCI said it would offer "4K plus" services to its customers, Each 4K plus "services to its customers with a 4-wire balanced and equalized transmission pathway, MCI said. The specialized carrier will assume "management responsibility for end-to-end service," according to an MCI spokesman.

The rate structure announced by MCI. vice, according to an McI spokesman.

The rate structure announced by MCI includes five data offerings ranging from 300- to 9,600 bit/sec serving 21 major cities. A comparison of the MCI prices with comparable Bell offerings shows users can save from 28% to 44%, dependence contracts and account of the MCI section. ing on speeds and options, MCI claim An independent comparison of AT&T and MCI rates by the Center for Communications Management shows that at 4,800 bit/sec MCI will be 10% to 20% 4,800 bit/sec MCI will be 10% to 20% below Bell, and at 2,400 bit/sec, the new carrier will be 30% to 40% below AT&T. The comparative study is available from Box 324, Ramsey, N.J., 07446.



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**CW Supplement** 

# ★ The 360 Lives On ★

January 31, 1973

Supplement Page 1

"The 360 is not dead - long live the 360!" That's the battle cry of many users who are continuing to enhance their "obsolete" systems and who have given these independently "souped-up" 360s a new lease on life.

This supplement describes the enhancements, looks at the trade-offs and discusses why users are still finding their 360s cost-effective.

# Firm Swaps 145 for 360/50 **And Users Share Happiness**

"The real savings are in com-paring the 370/155 with the 360/65. It is possible to get equal throughput on the Model 65 and save \$10,000/mo." – auser

There is no doubt that for certain apple cations an IBM 370 system is the most cost-effective mainframe, but more and more users are discovering a surefire way to retain a solid niche for their 360

In most cases the decision to stay with a 360 is based on careful trade-offs and evaluations. The comparisons are usually made between an all-IBM 370 and a 360 obtained on third-party lease and en-hanced with independent main storage and peripherals

and peripherals.
The Computer Research Co., which provides machine time to users who need access to specific types of systems but access to specific types of systems but with a 150 (150 cm.) which are looking for core and a 2314 disk capability." The company considered exercises were supported to the control of the 150 cm. and 150



Ron Ellis, Computer Research preside checks on some third-party lease prices. the fact that real throughput on the 145 "was just not realized."

"I am certainly not anti-IBM," Ellis said, "We have a 155 which is serving us well and we plan to install a 135," he said, "But the 145 w." just not the right machine for the RJE customers that were buying time on it," he explained,

After extensive evaluation, Ellis and his company decided that a 512K Model 50 was cheaper and more cost-effective than the 256K Model 145.

"You have to determine what you can buy for about \$15,000/mo," Ellis said.

was not an important criterion for the RJE customers accessing the 370 system. An upgrade to 512K was definitely indi-

The decision to go to a Model 50 has saved Computer Research about \$85,000/yr, Ellis estimated. And that has allowed the company to drop its rates shout 10% for users who now access the

"Most customers were 1/O-bo worst customers were I/O-bound and were not hurt one bit by our switch to the 50," Ellis said. One user was com-pute-bound when he switched his jobs from the 145 to the 50, and that cus-tomer was provided with time on the 155, Ellis said.

There were some inefficiencies with the Model 50. About half of the 512K was taken up with the OS MVT, but this still customers with another 256K they

could use, Ellis said. Calculating the net effect of running jobs on the Model 50, Ellis said customers experienced "zero degradation" on I/O bound jobs. On compute-bound jobs there was a "50% degradation" on some jobs, but these users were just switched to the faster 155, he added.

The \$85,000/yr savings were not just based on one specific configuration – they were based on a 256K 145 com-pared with a 256K Model 50, But savings pared with a 256K Mouer 30, But 5... of \$45,000/yr were still possible wh comparing a 512K Model 50 with the 256K 145, Ellis said.

"But the real savings are in comparing the 370/155 with the 360/65," Ellis said, "It is possible to get equal throughput on the Model 65 and save \$10,000/mo over

Based on this comparison of 512K systems, Computer Research recently installed a Model 65 as added backup for Its 370/155, Asked why his firm did not replace the 155 if the Model 65 was more replace the 155 if the Model 65 was more cost-effective, Ellis stressed that the 370 was a purchased machine. But the company was able to achieve some cost-effective upgrading by ex-

Independents Ponder Virtual Storag Benchmarks Prove 360's Worth Independent Software Stresses 360 Smaller Models Not Forgotten 30s May Handle Medium Nets

Disk, Cache Memory for 65 Users Computer Sharing Cuts Costs 50 Better Price/Performer Than 1

50 Better Price/Performer Than 145 Third-Party Lesse Reduces Budget

Unwritten Fear Strikes Those Who Mix

### From New...to Old



replaced its 256K 370/145 with a 512K 360/50 (right). Di , vice-president, Madansky & Assoc. enters a job on the "new" 360.

panding the 155. "We managed to expand the system from 1M bytes to 1,5M bytes with no increase in costs," he said.

The earlier 1M-byte system included 512K of purchased 1BM core and 512K of rental core from 1BM which cost the firm substantial overtime charges based on the 500 hr/mo average operation of the system. An upgrade to 1,5M bytes would have required the purchase of an

\$83,000 storage adapter from IBM before the system could be expanded to 1.5M bytes, Ellis said.

oytes, Ellis Said.
Instead, Computer Research replaced
the 512K memory on IBM rental and
installed a IM-byte memory box from
Cambridge Memories, Ellis noted, While
he admitted this comparison was based
on IBM charges with overtime rates, a (Continued on SIPage 2)

# Replaces' Dual 135s

Edos Helps Boost Model 40

In many cases, the choice of a 360 over the installation of a 370 involves cost performance trade-offs measured accord-

performance traue-uns measurements are ingo hardware capabilities.

But as more meaningful independent software becomes available, some users can enhance their CPUs and increase the efficiency of their installations by carefully selecting non-IBM software.

fully selecting non-IBM software.
One of the most ambitious 360 software systems now available is Extended DOS (Edos) from The Computer Co., Richmond, Vs. First announced in the spring of 1972. Edos has proven an effective 370-stopping enhancement for several

We will be able to do the same work on one 360/40 that we previously had allocated to two 370/135s," said Owen allocated to two 370/135s," said Owen McBrien in describing the value of his independent operating system, plus some independent operating system, plus some representation of the control of the eral Inc. where he is director of data processing. He had a jump on other in-novative users since his installation served as a test site for much of the Edon software, but he is quite willing to share his results with others.

"We experienced a 13% to 15% increase in processing throughput with just basic Edos," McBrien said. The comparison was

nt Page 10 nt Page 14 nt Page 15 nt Page 16

based on earlier operation on the same mainframe using IBM's DOS.
"The improvement was based on the same machine with the same programs," he said. In the first month Edos was monitored, the company had 10% in-crease in workload volume, McBrien esti-

The execution time of individual programs was not affected by Edos but the "job set-up time" and the "program load time" were improved. The reasons for this increased efficiency are the relocatability of all programs, regardless of language, to any partition; and the block fetch feature which makes the "loading program much mo efficient th

IBM's," the user said. The major operating advantages of Edos, which are similar to OS/MET citied automatic volume ensing, partition load balancing and volume dump restore. These Edos features "reduce the amount of operator set-up timejob and therefore they reduced the time the system was after the property of the pr ertition support. The introduction of Edos has reduced

the operations overhead and freed up CPU time, he said. "With an increase in workload we had a decrease in meter hours during the first month," he said. From this we calculated that we had about a 15% increase in processing," he

### More Savinsa in Sight

Media General is operating with a rental IBM Model 40 so the reduction in oper-

IBM Model 40 so the reduction in oper-ating hours meant a savings of about \$600 for the first month, McBrien said. But the firm is replacing its rental ma-chine with a similar configuration from a third-party leasing company. And when the third-party Model 40 is installed, there will be no overtime charges at all,

(Continued on S/Page 6)

### DAT Box Coming?

# Independents Ponder Virtual Storage for 360s

5y Ronald A. Frank
Oras CW Sure
It is certainly not unusual for a 360 user
to consider soughting a 370 system. Undoubtedly the user's local IEM representative has more than once described the
added capabilities, and perhaps even
status, involved with the operation of
"this year's model instead of last year's
model."

model."

But most users no longer accept the status symbol approach. And few IBM people try to appeal to the user in this way. So the trade-offs boil down to a dollars and throughput comparison.

In the technical area the user has to In the technical area the user has to consider the Impact of a virtual operation on his shop. In almost every other area, the independent suppliers can duplicate (and often surpass) IBM product offer-

Memory expansions to almost unheard of limits are becoming routine, faster

tapes and disks often outperform the IBM units they are designed to replace, and independent terminal equipment is normally faster and cheaper than IBM's But the advantage without sensory will bring the advantage without sensory will bring the advantage without sensor will be read to the advantage with the advantage with the advantage with the advantage will be read to the advantage will be read to the advantage of witted amonty operation become apparent to the user.

Support offer a relative valuable capabilities upport offer a relative valuable capabilities.

support offers really valuable capabilities to users, the independents have some interesting options available to them.

Probably the most glamorous possibility will be the addition of the Dynamic Address Translation (DAT) to the 360, a capability that has been attracting the interest of users and vendors alike [CW, Nov. 15, 1972] for some months.

chased 155s and 165s by IBM to convert these systems into 158 and 168 configu-

rations.

But one crucial event holding back a
DAT box for the 360s is that the first
BM fature for the 15s is not scheduled
of this year. Presumably any independent
version of a DAT feature will be based on
the IBM device which it described last
August as "hardware facility."

box is that we really don't yet know
much about them," according to one
independent vendor's marketing man.
Wevertheless, most experts agree that a
Newtribents most experts agree that a
least some 360 models before the end of
the year.

least some 360 modes before the end of the year. "Some vestige of virtual storage for the 360" will be available soon, according to Edward O. Boutwell, Jr., executive vice-

ent at Compata Inc., a consulting

Several Options Available

A virtual memory feature could be im-plemented on the 360s in several ways, according to Boutwell. The options include hardware, software or microcode. And almost any version will require modifications in at least two of the three areas,

The Models 50 and 65 will be the first 360s to get the virtual capability, he

One of the major incompatibilities be-ween the 360 and 370 is that there are a tween the 360 and 370 is that there are a small number of instructions that can run only on a 370. But these instructions only on a 370. But these instructions which can be executed only on the 370 are not a major headache to most users. But this 360/370 compatibility gap is bound to widen as more details of the IBM VS operating systems become known. Some experts see the IBM DOS stabilization as an indication that signifi-

cant enhancements will soon be nounced for the 370 software.

nounced for the 370 software. Despite this stabilization, however, the opportunity for independent software development on the 360s seems better than ever, "Users are really beginning to focus on the weeknesses of OS and DOS," Boutwell said. Among the areas that can stand improvement by the independents, he predicted a new scheduler for OS and improved job management packages and language translators for DOS.

DOS.

One of the more intriguing approaches to enhancing the 360 predicted by one consultant involves the use of simulation. Non-compatible 370 instructions compatible 570 instructions consultant superior on 360s using independent emulation software, the consultant suggested. The emulation method might also be a feasible way to add virtual memory capabilities to the 360 line, he added.

### Firm Trades In 145. Users Reap Benefits

(Continued from S/Page 1)

Continued from SPege 1]

50% increase in memory was schieved
without any increase in cost, Ellis side.

When the Model 6.5 Ellis has made some significant independent peripheral enhanced
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### Souped-Up Model

"This combination on the 65 will make it comparable to the 155 at about half the cost," Ellis said. To be more specific, a Model 65 with 512K third-party leased a Model 63 with 512K thurd-party leased main memory, a liM-byte Ampex core box with cache memory and 3330-type disks from Storage Technology Corp. with provide the performance of a 370/155 with 1.5M bytes of core and 1BM 3330s. The Model 65 will also save \$185,000/yr, Ellis said.

Ellis said.

But despite the savings Ellis is not ready
to abandon his 155. "There are some
instructions that our customers use that
can only be executed on a 370 and not a
360." Ellis said. In addition, the Model
65 does not have a hardware emulator to
allow customers to run DOS under OS, he
said.

Computer Research also has two 360/30s. One of these will be replaced with a 370/135 early in 1973, Ellis said. The 135 will be a good bargain for Moc 30 users, he believes. "These users will able to go to a 135 and get the throug put of a Model 50," he predicted.

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# Five Months of Benchmarkina Convinced User to Stay With 50

For most users, the comparison of main-frame systems is based on cost and frame systems is based on cost and throughput timings of a few jobs run on several systems. But one midwestern com-parent on the systems of the systems of the study during which it benchmarked a known job mix from its 360/50 at various outside locations, including sites made available by IBM.

The benchmarks were designed to evalu-ate the relative throughput capabilities of 360 and 370 systems. Included were com-parisons of virtual and non-virtual opera-

The benchmarks convinced the user to stay with his independently-enchanced Model 50, with a future upgrade to a Model 65. This conclusion was based on relatively small throughput improvements from the 370s tested. And in some cases

the 360 was actually faster. The jobs used in the benchmark evalua-tion were based on the firm's Model 50 which has 768K of core including 512K

which has 768K of core including \$12K of native memory from IBM and 256K of AMS core supplied by Itel.

The in-house configuration includes 16 Teiex 2314-type disks on selector channels 1 and 2; four 2403-1 Telex tape drives on selector channel 3; and the remaining 10 peripherals including printer, eard reader, etc. on the multi-place remaining 10 peripherals Model 6.5

The user also has an in-house Model 65 with 512K of native IBM core and IM byte of IBM 2365 LCS storage. Both systems are leased from Dearborn Com-

systems are leasted from the systems are leasted from the puter Leasing. One of the most interesting benchmark results demonstrated that the 370/145 with an IBM 2305 fixed head disk ran no faster than a system with just 3330s and 2314s. (see chart 3)

Among the problems encountered in running the benchmarks was the inability running the benchmarks was the inability to get Bdam to work under VS1. A great deal of time was devoted to debugging because it was not possible to debug under paging. "Each time something went wrong, it was atteady destroyed in memory," the user said. Many patches or modifications to VSI were required to get the benchmarks to run. When a tape or disk was not ready, the 370 would not give out a message, the

the 370 would not give our a message, use read-ultra would just have yo," be said, "without getting any communica-tion back under the VS peging system." On the 360, a message would be generated to flag a peripheral that was not lin the paging environment of VS ), if two partitions were allocated to reminals, the system might encounter de-lays up to 12 minutes when both parti-lity to 12 minutes when both parti-file," the said seek, access to the same These delays were based partly on joint

System	Size	Time	
360/30	64K	35 min	
360/40	256K	28 min	
370/145	256K	20 min	
370/135	256K	20 min 20 sec	

Chart 2. In one "screened job mix" the Model 30 with 256K was faster than a Model 40 and almost as fast as a 133 and 145. The software included IBM's CS 30 and 40. An IBM 1400-type job was also run "for curiosity."

usage of 1/O handling and coding in dif-ferent programs, he added. The 370 sorts under VS1 were also a problem and ran much less efficiently than Sort II under

OS.

"The Model 65 with Telex peripherals ran as fast as the 145 with 3330s," the user said. "So we still have the upgrade potential of going to the 3330-type de-

After careful evaluation of all the benchmarks, the company decided to go to dual Model SOs instead of going to the

370/145

370/145.

A later upgrade to a 360/65 is planned, with independent 3330s. The 65 will not only improve on the 145 but probably will have better throughput than the 155,

System Peripherals		Operating Software	Time	
360/50	Telex tapes, disks	Release 19.6 OS/MFT	1 hr 27 min	
360/50	Same	Same with Hasp	i hr 6 min	
360/50	IBM tapes, disks	Same with Hasp	1 hr 17 min	
360/65	Telex tapes, disks	Same with Hasp, all jobs in native core	48 min	
360/65	IBM tapes, disks	Same with Hasp, all jobs on LCS storage Release 20.1 OS/MFT, split native and LCS	57 min 51 min	
360/65	Telex tapes, disks	Release 19.6 OS/MFT with Hasp	49 min	
370/155	1BM tapes, 2314 disks	Release 19.6 OS/MFT with Hasp	- 49 min	
370/155	IBM 3330 disks	Release 10/1 OS/MVT	33 min	

Chart 4. An additional group of tests was run using an abbreviated job mix on two partitions. Partition one included the file administration, stock status, and back-up files. Partition two included the MRP program, program testing, payroll and a data retrieval system.

System	Peripherals	Operating Software	Time .
360/50	Telex tapes, disks	Release 20.6 OS/MFT	1 hr 58 min
360/65	Same	Same	1 hr 18 min
370/145	IBM 3330s	Same	1'hı 12 min
370/145	1BM 3330s, 2314 and tapes	OS/VSI Virtual = Virtual	1 hr 3 mir
370/145	Same	OS/VSI Virtual = Real	1 hr 17 mir
370/145	IBM 3330s, 2305, 2314 on IFA	OR/VE1	1 5 2 - 1

Chart 3. The above results were obtained using the five-partition job mix in Chart 1.

Partitlon	Size	Software
1	40K	In house "writer" called Modular Teleprocessing (Motel). Packs data for transmissions. Handles tape, disk and printing jobs.
2	60K	IBM's General Inquiry Control System (Gics) super-modified so IBM no longer supports it. Handles teleprocessing with 21 2780 terminals, and five 360/20s used as satellite CPUs.
3	60K	Gics used to control Bunker Ramo CRTs
4	140K-160K	Production jobs, file administration program, sorts and stock status.
5	140K-160K	Manufacturing Records Processing (MRP), applica- tion package not-supported by IBM.

Chart 1. Mix of Jobs Run on Each Partition

# **Edos Helps Enhance Model 40**

(Continued from S/Page 1) (Continued from S/Fage 1)
The total yearly savings resulting from
the switch to a third-party Model 40 is
estimated to be \$127,000, "and you
hardly argue with those numbers," he

hardly argue with those numbers," he added.

"And you also car! justify a 370 when do you're looking at that kind of swings. The 370 would have increased our costs be about 370,000/ear." McBrien said.

Edos was hardly added into a simple operating environment, McGrien and.
"We use almost all available programming and all available programming and all argues and a simple services." A copy and some TP work. A we had a real good mixture," he said.

Edos gives my batch-oriented shop all

real good mixture," he said.
Edos gives my batch-oriented shop all
the operating advantages of OS without
the tremendous cost of the core for the
supervisor. We increased the supervisor by
2K to install the software, he said, but
Edos operated with a 24K supervisor
compared with a 92K supervisor for OS. As an additional benefit, Media General plans to instali the Edos spooling feature [CW, Jan, 24]

The spooling capability has been tested for some months at Media General and McBrien said he "will eliminate seven to

McBrien said he "will eliminate seven to nine hours of operations time each day." This means the company will eliminate an entire eight-hour labor shift," he said. "We have proved in controlled tests that compilations can run 60% faster with the Edos spooling feature compared with direct printing under 1BM's DOS," he

McBrien said he "discarded" IBM's Power spooling package about two years ago "because of the size of the Power

partition. It was going to have to be a 38K partition, while the Edos spooling utility operates in the minimum partition size of 16K.

"We intend to operate the spooling utility, which retrieves the output lifes from the disk boffer, in foreground 1 of system be which is really the fourth partition that the user can get under Edos, he said. So we will not take away from the major problem program partitions. We will rost this sa aubudiary partition," he said. Media General uses its Model 40 to publish at satistical reference publication called \*Financial\* Weekly. The publication of "totally produced" on the 360 in about

is "totally produced" on the 360 in about three and a half hours for a "32-page paper that includes "semi-log graphs." McBrien said.

The Model 40 is connected to a Harris Intertype Fototronia/CRT which pro-duces "totally paginated pages." The only thing not done in the pasting up of art work, he explained. The system sets the at a speed of about 2,000 char/sec, he

The extra time freed up by Edos has allowed the firm to shift all classified ad production sway from "a series of minis" onto the Model 40, In addition more management reports, another publication and some experimental work can now be added to the 360, McBrien said. All this will be added while the work hours are

reduced, he said.
"We would have been forced to go to a 370 without Edos. And now with spool-ing we really don't need a second CPU because we have enough available time," McBrien said.



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### DOS Stabilization Helps

# Independent Software Emphasizes Value of 360s

By Don Leavist the CW Sta

For all the advances in hardware now available to the 360 user, it can still be usually argued that software is what makes the system work, and software is what is keeping users (especially those operating under DOS) linked to their vertices.

operating under the coupling of the coupling o

DOS for the 360.

Some users thought this meant IBM was pulling the rug out from under their systems to get them to move up to OS (with its greater appetite for core) or to determine the rug of the

exactly the opposite. IBM was renouncing its "right" to modify the basic system software any further, even if it felt a functional enhancement would be beneficial to the users. It was therefore agying alike, "OK, here is a firm base. Go shead and build on it as you wish and we won't come along later to make your work redundant or inoperative."

Some vendors had foreseen that DOS.

would never develop in certain directions and had offered enhancements to the available system even before the "functional stabilization" announcement. Since the announcement, however, the number of packages has increased and the number of users of the packages has jumped even

faster. More currently available enh packages offer a combination of features to extend IBM's DOS facilities – usually to make it more like the more complete Operating System (OS). The independents have worked to improve I/O speeds, to provide more effective program devel-

to provide more effective program devel-opment tools, more effective system re-source utilization and to give the user a better appreciation of what cost was in-curred by individual jobs. Efforts to improve the 1/0 speeds have generally centered around the concepts of spooling, or moving data destined for a relatively slow printer or punch to inter-mediate storage on disk or in core. Once that transfer takes place, the generating application program can immediately eturn to its processing.

IBM itself recognized the possible val

IBM itself recognized the possible value of spooling and has long offered the Power spooling package without apparent cost to its users. Independents such as Boothe Computer note, however, that their spoolers use far less core than

In many cases independent spoolers also allow the stored I/O data to be moved out to the appropriate peripheral when that device becomes available, while the application program continues execution. Some spoolers support shifting card images to disk for faster processing of

Images to disk to lesse, processing input as well as output.

Independents have always been stronger than IBM in providing support for source program libraries under DOS, to eliminate unnecessary handling, and perhaps mis-handling, of card decks.

nanding, of card decks.

Current library systems tend to go even further, allowing the storage of several identifiable versions of individual programs. And vendors have begun to stretch the basic program library concept to in-clude languages other than just those provided by IBM.

Library support for Job Control Lan-guage (JCL) statements is also available from some vendors, again to provide the DOS user with the same "proc lib" type of facility 1BM has included under OS for some time. Complete job streams can be cataloged and invoked later on demand.

Some of the packages support the creation of totally new job streams at execution time, by allowing the user to "pick and choose" then which of the

The independent vendors have also The independent vendors have also attacked one of the basic limitations of DOS/360: the fixed program partitions and the assignment of programs to specific partitions. Several packages work with the standard compilers or link-edit routines to store object programs in relocatable form with addresses that allow the programs to be used in any available

partition.
Without this capability, users who fo without this capability, users who lore-saw the possibility of running a program in more than one partition had to store separate images of the program for each partitition, adding immensely to the disk space used by the libraries. With reloca-tability, a single image is moved into whatever partition is then available.

Still another facility many independents have included in their DOS enhancement packages, and which relates neatly to use of partitions regardless of what the user may have specified in his JCL state-

ments.
One vendor, The Computer Co attacked the partition problem from a different angle. With an option available

it to the users or independent vendors to capture these records and to summarize and report the accumulated data. Several vendors answered this challenge and, in some cases, anticipated it by programming the complete accounting logic, from creation of the data records through report generation, withour refer-

"Ironically, perhaps the most important software announcement of the past year was not a new product at all, but rather IBM's 'functional stabilization' of DOS for the 360."

under the company's Extended DOS (EDOS), users with enough core can have six partitions, instead of the normal maxi-

mum of three.

Job accounting, by which the computer itself reports how it is being utilized, came into its own in the past year or so.

IBM included a module in DOS Release
25 to create accounting records, but left

ence to any coding provided by IBM.
While job accounting provides a mean
of billing user depertments for system
resources used in their behalf, another
range of packages – program run-time
analyses – enable the programmer to get
a better picture of what his product was
actually doing, and how it could be
modified to do the job better.



LPS-Logicon Peripheral System adds a disk controller and 11-platter disk drive to the 1130. LPS options include a second disk drive, a SAC extender and a 600 LPM printer. The system supports

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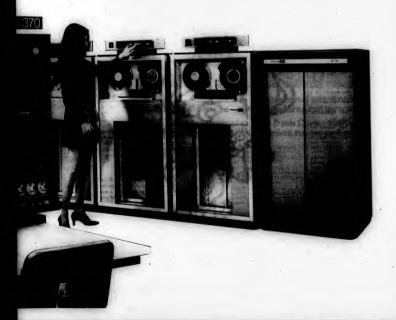
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### PLUG ENHANCED CAPABILITY ENHANCED CAPABILITY ENHANCED CAPABILITY ENHANCED CAPABILITY AND PROVEN FIELD PERFORMANCE AND PROVEN FIELD PERFORMANCE AND PROVEN FIELD PERFORMANCE AND PROVEN FIELD PERFORMANCE AND PROVEN FIELD PERFORMANCE



# Self-contained diagnostics, expanded range of data rates, increased reliability and reduced cost are all built-in extras in TELEX 6420 tape drives and 6803 controller.

TELEX tape drive models 6420-3 through 6420-7 are direct replacements for the IBM 3420 series units, and offer two additional tape speeds with corresponding data rates not available from IBM models. Dual density permits operation at either 800 BPI NRZI or 1600 BPI Phase Encoded. Optional seven track or nine track recording allows for data den-

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BPI NRZI. The TELEX
control, three-control
and four - control
switch features allow the accessing
of up to 16 tape
drives through two,
three or four controllers. The two-channel
switch allows two data
paths to the maximum
of 16 drives through one
TELEX controller.

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micro-programmed diagnostics quickly and 
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and provide the necessary information to 
correct errors with a minimum of interruption.

A major feature of the TELEX 6803 Tape Controller is the Radial Device Attachment which allows each tape drive to connect to the controller independently. This provides the ability to switch any drive off-line without interfering with the functioning of the remainder of the subsystem.

As always, among the greatest advantages of TELEX 6420/6803 tape subsystems are

of TELEX 6420/6903 tape subsystems are the attractive lease and purchase prices. Compared to IBM prices, substantial savings are realized by the selection of TELEX equipment. With the inclusion of the TELEX unlimited use policy which is standard with all TELEX.

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# Smaller 360s Are Not Forgotten

While independent enhance-ments for 360 systems are nothing new, most of the initial products concentrated on the "large ticket" systems such as the Model 50s and 65s.

But the enhancement suppliers now appear to be setting their sights downward to the smaller systems. One large group that will undoubtedly benefit is the Model 30 users.

Model 30 users.
The 360/30 Is not exactly a newer model in the 360 line.
The first system was delivered in 1965. But the number of Model 30 users is large, probably the largest with the exception of the 360/20. According to figures compiled by International Data Corp., more than 4,780 Model 30s are operating at users' in-

More than 20% of these systems are on third-party lease with less than half on straight IBM rental. Presumably the re-But regardless of their origin, these users probably can expect increasing support from the in-

One of the first Model 30 en hancements was the expension of memory beyond rated IBM limits. And some users are push-

The Greyhound Computer Corp. data center in San Fran-cisco has a Model 30 with 256K.

cisco has a Model 30 with 756K. This expansion has allowed the installation to operate in a partition environment using Grasp independent software and DOS. With jobs such as sorts, the expanded system "has picked up shout 18% to 20% in throughput," according to a Greybound spokesman. This estimate was pookesman This estimate was benchmark of one particular job. "Vou can get longer strings in core and can do more core sortium than disk sortium." In said. ing than disk sorting," he said. The Greybound Model 30 includes one eight-spindle 2314 cludes one eight-spindle 2314 and five 2311s plus eight 2401-3 tape drives all on third party lease, the Greyhound spokesman

The large configuration h the large configuration has been operating for about six months and additional upgrades are being planned. The most im-portant will be the installation of the new 360/30 accelerator [CW, Jan. 10] which will allow the 30 to operate with through put similar to a Model 40, according to the developer, Computer Hardware Consultants and rvices Inc. (CHCS)

The accelerator feature prom-The accelerator feature promises to add some new dimensions to the already-sticky maintenance problem. When the independents began to push their add-on memories beyond the limits specified by IBM, the mainframer balked at maintain-ing such systems. And the ac-celerator, according to CHCS, will go even further to alter the microprogramming on the Model 30. What effect this will have on 30. What effect this will have on IBM's diagnostics and mainte-nance is not known.

But CHCS spokesmen are pre-pared to maintain these Model

### About the Editor

This supplement was prepared under the direction of CW Tech-Frank. Frank has also been ra-sponsible for the communica-

Add-on Memory

## Accelerator

Disk Devices

30s and anticipate that IBM will refuse to maintain even the "native portions" of these CPUs. Early in 1972 the Model 30 became the focus of a maintain nance problem between IBM and Data Recall. The situation was apparently resolved when the independent modified some portions of its add-on configuraortions of its add-on configura-

tions.

At present IBM does maintain independently enhanced memories on 360s including the Model 30 but the decision is made on an individual basis for each installation.

each installation.

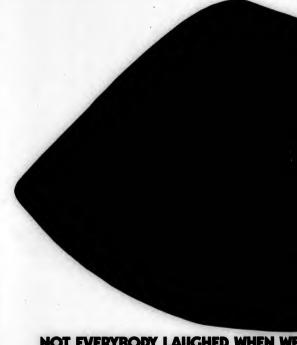
Based on a judgment handed down by the U.S. District Court in California in March 1972, IRM will maintain "unaltered IBM will maintain "unaltered portions" of Model 30 CPUs on portions" of Model 30 CPUs on a "best efforts" basis. This deci-sion resulted from a suit brought by Itel and Advanced Memory Systems Inc. against IBM. While the court decision applied only to the two indepen-(Continued from S/Page 11)

Want a Used 'New' 30?

Want a Used New 30?

For users who wat a "new" holds 30 from 18M the machines are available. While it is possible to order a 30, according to an 18M bit speakeman, the machine will not be a 20, according to an 18M speakeman, the machine will not be speakeman and the speakeman and t

Officially, IBM supplies Model 30 configurations up to 64K with 96K available on a Request for Price Quotation (RPQ)



# NOT EVERYBODY LAUGHED WHEN WE Some just smiled, installed an ENTREX

When we first claimed our key-to-disk data entry system was of people laughed. And said we couldn't deliver. Today, more than 100 ENTRES Vigetim 400's, with nearly 2,000 DATA/SCOPE lavystations are installed across the country. And the number is increasing—more than 20 System 400's are being shyped moretilly. Other doublers said our system wasn't all that good. Yet System 400 is

ed for them (it was -especially our e software is the most comprehensive Now you have no more excuses. System 480 is working for safe

# Smaller 360s Aren't Being Forgotten

(Continued from S/Page 10)
dents involved, it apparently
applies to other independent
equipment as well. IBM will not
comment on a blanket policy for
providing maintenance to independently enhanced Model 30s,
but says each case is decided
senantally.

3330-Type Device

Another potentially interesting Model 30 enhancement is the addition of a 3330-type device. While some experts argue that this type of device is too fast to be supported by a Model 30 processor, others see a buffer device being introduced by an

independent supplier.

A buffered controller for the Models 30, 40 and 50 was announced last year by Computer Investors Group. Production of this device, to be handled by International Peripherals and Computer Corp., has apparently been delayed until later this year, according to a CIG spokes-

If the buffer principle works, the addition of a 3330-type unit would further enhance the 30 to a point where an upgrade to a comparable 370 such as the 125 would become less appealing to

One midwest DP manager

facing the 30 versus 125 decision sees very little content between the two systems. He now pays 48,600/mm for his Model 30, To "nepgrad" to a smiller 125 with "nepgrad" to a smiller 125 with cont at least \$8,000/mm, he estimated.

The user is planning to carefully evaluate the performance of a 30 with expanded memory of 30 with expanded memory with this type of orice porned.

and other independent options.
"With this type of price spread, I
can afford a lot of enhancements
before the 30 becomes as expensive as the 125," he said. And by
enhancing the 360, he feels he
can equal the capabilities of the
125 at greatly reduced cost.

### How the Accelerator Dates

IBM 360/30	IBM 360/40	CHCS Accelerator 30		
1 byte	2 bytes	2 bytes		
1.5 usec	2.5 µsec	I.5 µsec		

Chart compares the performances of the IBM Model 30 and

OP Code	Code	360/30	Accelerator 30
Or Code	Code	300/30	Accelerator 30
Load	58	24 μsec	16.5 µsec
Store	50	24 µsec	16.5 µsec
Load Multiple	98	206 µsec	105 µsec
Add	5A	29 µsec	22 µsec
Load Register -	18	17 µsec	9 µsec

Some instructions execute almost twice as fast when run on a system using the accelerator feature. The chart compares the IBM 360/30 timings with similar instructions run with the

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# Accelerated 30 Should Handle Medium-Size Nets

By Alan Taylor

By Alan Taylor of the two waster NEWTOWN, Pa. — The accelerated Model 30 introduced by Computer Hardware Conditions of the State of the

These conclusions are based on the preliminary results of the first tests of the accelerated system in operational environ-ments. The tests are currently being conducted by Marc Reid-

being conducted by Marc Reid-stein of Trilog Associates Inc.
Particularly important in the Model 30 modifications being tested was their impact on Model 30-powered telecommuni-action networks. Until now the Model 30 has not been used in medium-load telecommunication systems being run on top of batch processine. batch processing

The software simulation micro-programming used in the star-dard Model 30 for handling such operations used designed for low operations used designed for low ference rate. (It takes around 80 machine cycles on the standard system to handle each single byte being masmitted, so the can interfere seriously with the operations in a batch partition.) The CHCS improvements have terference, and so increasing the capacity of the accelerated system to handle network loadings with the control of the control of the control of the capacity of the accelerated system to handle network loadings with the control of contro The software simulation micro-

### IBM Said to OK Off-Line Switch

Some of the independent sup-pliers have tried to ease the maintenance problem by pro-viding special exclusion features that will "lock out" the indepen-dent memory. The effect of such

dent memory. The effect of such switches is to make the "native or unastered" portion look like an all-IBM system. And the theory is that IBM will maintain such CPUs where non-IBM parts have been switched out. One of the more recent switch arrangements was announced by Computer Hardware Consultants & Services Inc. (CHCS) which maintenance of highly up-graded" Model 30s under "stan-dard spreements."

graded" Model 30s under "stan-dard agreement," The "off-line switch" which CHCS says has been approved by 1BM, "dectronically negates alterations to Model 30 computer systems that expand core memory up to 256K. By throw-ing this switch the IBM Cus-tomer Engineer isolates the Model 30 from the CHCS added-roun standard diagnostic mainte-nance checks," according to CHCS.

CHCS.
After inspecting one of the CHCS Model 30 installations with the write, IBM wrote the independent supplier that "It is Engineers to maintain the unstated portion of the IBM 2030 (CPUI under our standard maintenance agreement." Similar installations would be after the control of the IBM and the

Model 40 or 125 systems.

The first tests were designed to nake throughput comparisons of the accelerated Model 30 and 40 anchanged Model 30 and 40 of the accel

systems.

The tests were designed to get a handle on both full OS performance and DOS performance. In each case Reidstein elected to concentrate upon one proces dominated program and one I/O concentrated program.

Concentrated program.

The I/O jobs selected were the disk sorts under both DOS and OS. These were checked on a 100,000-record file of variable length records averaging 20 bytes each.

The record ID and the record The record ID and the record length were chosen as keys to provide for a randomized distribution of records. The DOS system with its lower overheads in the I/O area showed its strength by sorting the file in 12 minutes, while the OS system took 16 minutes to complete the

Job.
After watching the operation,
Reidstein said he anticipated the
accelerated system would show marked improvement over the standard Model 30, even though the I/O loads were predominant

during most of the job.
"The first phase," he explained, "is concerned with an

internal sort which really uses the processor. I was watching the wait light, and it hardly flickered at all until after the necessor was flat out. This must have improved the performance by comparison with the standard model," he said.

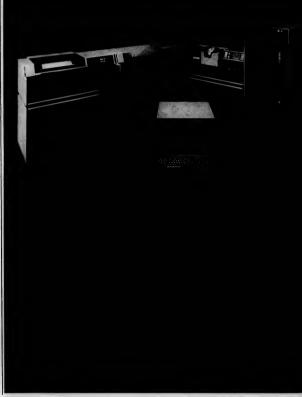
It illustrated, he commented, that even programs such as sorts, which were often thought to be 1/0 bound, did in fact have processor involvement which could be improved without any I/O anges.

No tests were done on the use of remote networks. Reidstein



inges to the Model 30 stan-

performance of the accelerated Model 30 in the telecommunica-tions area can be forecast with reasonable confidence, owing to the use of heavy I/O command



## Will Lightning Strike the 'Free Soul'?

# Secret Fear Stalks Those Who Would 'Mix'

The enhancement of a user's 360 system is invariably based on a third party leasing arrangement and/or the use of independent peripherais. We have not been supported to the significant surings that can be obtained with a shift from IBM to independent equipment, relatively few users have made such a shift. The hestiancy on the part of The hestiancy on the part of The hestiancy on the part of one an unwritten fear that lightning will strike the mixed system.

ning will strike the mixed system site while virtue will prevail for

the all-IBM user. the all-IBM user.
Industry experts estimate only
12% of U.S. users are innovative
enough to take the plunge and
use some sort of non-IBM equipment. And with few exceptions
these users not only save 20% to
30% each month but they get
maintenance and other support

which is at least as good as that provided by IBM.

Users considering the installa-tion of an independent disk or other peripheral system often hear "horror stories" about systems that crashed or files that

were destroyed because the cus-tomer put his destiny in the hands of an independent sup-plier. Few of these stories are ever verified, probably because names are rarely used and sites never identified.

The users who are the con-

The users who seriously con-sider independent equipment insist on a list of names of others

who have installed the same type of peripherals. Many indepen-dent suppliers readily provide

Still the ours of IRM ownership

pervades many DP installations.
"We thought about an independent disk system" one user said,
"but the IBM CB just shruged his shoulders." The user explained that this action on the part of the IBM representative had led to much soul searching with the subsequent decision not to contract for the independent

equipment.
In most cases the IBM man

In most cases the IBM man doesn't say anything against the proposed independent equip-ment, Merely the shrug of a shoulder or a similar implication

"IBM is learning to accept independent competition." - a mixed-system user.

is enough to give the DP man-ager visions of an IBM mainte-nance man refusing to answer a repair call or some other horrible

repair can or some other normole fate which never materializes. Satisfied independent equip-ment users look back on their all-IBM days and wonder why they didn't take the plunge earlier. And in most cases users find IBM's support changes very little when independent pe-ripherals are introduced.

ripherals are introduced. Especially in the area of 360 enhancements, the independents have provided users with features not available from IBM. The trend probably began with the add-on memory products to expand their mainframe systems beyond the rated memory capacity advertised by IBM.

Some maintenance problems did develop in this area but in each case where IBM threatened did develop in this area but in cach case where IBM finestense cach case where IBM finestense alternative to the user. Eventually IBM conceded that independently enhanced maintenance to the control of the control of

a certain type of equipment, al-ternative maintenance sources

For some users, again the in-novative ones, the third party maintenance firms have provided maintenance irms nave provided high quality support at signifi-cant savings. True, 1BM 360 maintenance is only about 3% of the total system cost but even a small savings is a dollar "carned"

Many installations get their first experience with third party maintenance when they acquire an independent terminal or an independent terminal or mainframe peripheral. After they discover that the mainte-nance company understands the equipment and its representa-tives are qualified to keep the tives are qualified to keep the units in running order, they may expand their non-IBM mainte-nance until an entire site is being supported by independent

sources.

"IBM is learning to accept independent competition. They
are reacting in a competitive
manner by trying harder to
please the customer," one mixed
system user said, "and that is
important development that will
benefit all DP sites."



MODEL 70

MODEL 74

MODEL 75

MODEL 78

MODEL 88

# Independent Disk, Cache Memory Due for 65 Users

### 3330-, 2305-Type **Devices Scheduled**

Among the more significant 360 enhancements scheduled for this year by the independent suppliers is the addition of 3330- and 2305-type devices to the IBM 360 Model 65. The addition of 3330-type disk to a 360 is limited to the Model 65 and is available only from

independent suppliers.

Itel has already delivered several of its 7330 disks with its 7830 controller and Ampex said it is working to install a similar unit.

Attractive Options The Itel system offers users some interesting options. Using an Itel controller to attach a 3330-type disk allows the user to also attach a faster 2305-type device with the same controller. On the other hand, BM systems using these disks require a

The Model 65 can handle a transfer rate up to 1.3 Mbyte so "any fixed-head device that does not exceed this rate can be attached," an Itel spokesman said. The Itel 7305 has a transfer rate of .9 Mbyte and thus falls within the limits of the 65.

The IBM 2305 units, however, with transfer rates of 1.5 Mbyte and 3 Mbyte are beyond the capacity of the 65, the

### an explained Another Trade-Off

The Itel 2305 equivalent will not be available until later this year, but in the meantime the company offered users another interesting trade-off to consider.

The 3330 and 2305 equivalents on the fodel 65 can be attached in two ways. The independent units can attach directly to the CPU's 2860 selector channel or

they can be attached using a special block multiplexer device.

considered to be a plug-to-plug modifica-tion, some OS software changes are re-quired on the 360/65, according to Itel. The basic software changes give the sys-tem Rotational Position Sensing (RPS) capabilities with both the 7305 and the 2320 these plus research.

7330, the spokesman said For users who find the software changes

For users who find the software changes distasteful, Itel's block multiplexer device will allow direct attachment of both 3330- and 2305-equivalent systems. The block multiplexer feature may include an "upgrade kit" for users who have a 2860 channel. This kit would allow these users to upgrade the block multiplexer to the capabilities of the 2880 channel, the Itel sookeama said. spokesman said.

spokesman said.

While the selector versus block multiplexer trade-off is different from a configuration standpoint, the Model 65 will look the same to the user, Itel said. "From the standpoint of walking up and running a job on the CPU there would be no difference in job control or operational procedure," the spokesman said.

### Ampex ECM Goes Beyond IBM 2361

Most independent memory add-on prod-ucts for the 360 are basically a "one generation" enhancement. Although ad-

usts for the 3500 are basically a "one generation" enhancement. Although additional increments of memory can be generated and the second of th have the company's Extended Core Mem-

The Mainframe-ECM is a semiconductor cache memory that operates at 250 nsec and is available in a 32K byte size for

and is available in a 32K byte size for each Mbyte of ECM.

The ECM alone, although a replacement system for the IBM 2361, surpasses the capabilities of the IBM system. And when the cache feature is combined with the capeaulist to the life System. Add what is capeaulist to the 360 memory is increased to 750 new which matches the speed of 18Mr 2365 memory is increased to 750 new which matches the speed of 18Mr 2365 memory system, according to Tom Harleman, marketing manager at Ampac. The cache, used in conjunction with the The cache, used in conjunction with the The cache, used in conjunction with the speed of the spee

ECM, Harleman said.

For less than a 20% increase in price, the 360 user will significantly increase the throughput of his system, he claimed. While users can decide how much additional memory they need, up to the 8M byte limit, Ampex said less than 1M byte expansions would probably not be worth-

while.
"We feel the user can easily go down to "We feel the user can easily go down to 256K of native memory on the 65," Harleman said, "and then add the cache and an ECM and get the equivalent of 1.25 million bytes." Or the user can add a 2M byte ECM and get the equivalent of

2M byte ECM and get the equivalent of 2.5 million bytes, he added.

The Ampex cache is very similar to the cache memory on the 370/155, according to Harleman. The high-speed cache to-gether with the slower speed main mem-ory serves to increase the overall through-put of the system.

The Ampex ECM-cache combination is scheduled to be available in "late spring," the company said, A 1M byte add-on lease will cost \$8,000/mo on a two-year contract with maintenance and the same system will sell for \$250,000.

system will sell for \$250,000.

Comparable mainframe memories from IBM and other suppliers lease for \$12,000 to \$36,000/mo and sell for \$500,000 to \$1.5 million, an Ampex spokesman said.



A 12-



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# Computer Sharing Cuts Costs for Model 30 Users

cial cost of an in-house 360 installation, one supplier has a different solution.

"We call it computer sharing," said Ken Ball, director of marketing for Grevhound Computer Corp., "and we use the concept to marry together similar users.'
The Greyhound approach allows a com pany to install a system such as a 360/30

# Life of 360 Set At 10 Years

While no one can predict exactly how long the 360s will continue to be an effective system for users, few appear ready to call the IBM family obsolete. One independent supplier, DPF Inc., is planning a 10-year program to support 360 users with enhancements products for their systems. These enhancements will give the user greater productivity from his CPU, according to Michael Creedon, vice-president and national sales

Included in the products DPF intends to offer are expected additions such as core, but some unusual ones are also planned, "We're looking at attaching 3705-type devices to the 360," he said, The 3705 is a programmable front-end scheduled for first deliveries this year. The processor is an upgrade for IBM's 270X family of line controllers, and offers many of the char-acteristics pioneered by the independent front-end suppliers.

While primarily useful "for the higher end" 360s, Creedon said DPF will also offer the 3705-type unit down to the

The independent supplier also expects to offer a non-IBM 3330-type disk system for the 360/50 and 65 and "to a certain degree on the Model 40," And the firm expects to provide com

munications users with an independent equivalent of IBM's 270X fine controllers, he added

### Eve on Software

In the software area, operating system enhancements will be available for 360 users, Creedon said. While the third party leasing companies have mostly con-centrated on hardware, DPF will increasingly turn its attention to systems and software support using non-IBM pro-grams, he said.

"As part of our 10-year plan, we realize the user will need support in non-hardware areas," he said. "We have to be able to assist the user in utilizing the

nent," he added. "We're looking at the 360 now as an economic tool that can he used to achieve certain throughput," Creedon said.

Another independent that feels it car supply a special capability to 360 users is Fabri-Tek Inc. For users with Model 65s with IM byte of storage, the company can add core memory "at the end of the feature wall," according to Ken Geason, director of end user marketing

the user has four IBM 2365-2 mcm ory modules or independent equivalents, Fabri-Tek can expand the system to 4M bytes. Without the add-on capability the customer would have to eliminate some of his 2365-2s to "make a port available, Geason said

While there are a "number of indepen dents" who have expanded 65s beyond IM byte, none have used the Fabri-Tek approach, Geason said. This capability is especially meaningful for the customer

who has purchased his 360/65 "This user would be really trapped unless he sold one or more of his 2365

nemory modules, Geason added.
The Fabritek core costs about 25% to 30% of IBM's equivalent units, he said This means a 70% savings in addition to he unusual expansion feeture, he edded. The first 65 memory, called 65+, was installed last spring.

"Most systems are used less than 180 hr/mo, Ball said. So in any given month as many as 744 hours can be allocated to outside users, he estimated, "It would not be in IBM's interest to put several users on one system," Ball said, "but we feel there is only a limited amount of 360 processing power eveilable and it should be used in the best way possible."

For the host user who agrees to have Greyhound find other users for his system, there can be financial benefits. Suppose IBM supplies a Model 30 for \$10,000/mo and we can supply the same machine for \$6,000/mo," Ball said.

"If the host user needs 200 hr/mo and we contract to have an outside user utilize 50 hr/mo, the host user will pay only 75% of the monthly charge for the

system. As more outside time is allocated on the system, the cost to the host user drops proportionately, Ball said.

At present, about six users have taken edvantage of the computer-sharing con-cept, he estimated. The principle can work for batch users who require physical access to a system or it could be applied to several users connected to a CPU through dete lines, Ball seid.

For variation, Ball believes more than two users could share a system as long as their processing requirements were met. In addition, the CPU need not be installed at the host user's site, "The Model 30 could reside at one of our data cen-ters," Ball said. And such a move could beln to expedite system maintenance by making the system more accessible, he added

### System Support

One of the user benefits of the Greyhound sharing scheme is that the cor pany cen provide the system support that often is very important to the smaller user, according to Peul LeClair, produc-tion manager of Greyhound's San Fran-

"Actually the shared installation be-comes an extension of our own date center," LeCleir said, He cited one exemple where e shered CPU was located closer to a potential user than the data center. "He needed some time so we provided him with resources that the host user did not need." he said. Obviously Greyhound will not find

users to share the host maehine without a charge. If the company egrees to contract for e block of hours on the host user's machine, the first hours pay Greyhound's costs end then the host user begins to get a direct reduction off his monthly rental In some ways the company may find mers, but the reletio ship cen also benefit both parties, LeClair cited one

provide the time desired by a customer who needed time. "We sent him over to a shared 30 system so we kept our eustomer happy and at the same time decreased the monthly cost for the host user," he said,



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# Users Keep 360s **370 Performance Often Less Than Expected**

The reasons for staying with a 360 are not always tied exclusively to cost. While most users el the savings are important, many are also disappointed with the relatively small performance ovement they can get with a upgrade. This increased operation, which often falls short of IBM's claims, has to be

these users say. 360s is that the 370s are so much more expensive than we feel is rranted. Our benchmarks have not satisfied us that the perform-ance claimed for the 370s is worth the additional cost," according to Phil Wanglan, vicepresident at Chicago's Central National Bank

"We felt we could afford just

360 users

they want

get any size

so much on the bottom line on an increased basis to IBM every year and after that it becomes We have had third-party leases

for the past two years and son

dramatically higher in price," he

"The reason for staying with 360s is that the 370s are so much more expensive than we feel is warranted. Our benchmarks have not satisfied us that the performance claimed for the 370s is worth the additional cost." - a user

of the IBM peripherals are under full two-year leasing to hold those costs down. And we are not dissatisfied with OS performance on the 360/50s,"

Wanglan said \*IRM was talking about a 1.9

to 2.2 increase in performance by going to the 145 from the 50. This was on a 256K Model 50

to come up with a 1.5 increase in performance we had to go to a 384K 145. And this 370 was

We didn't feel that the price gap which was in the six figure

gap which was in the six rigures per year warranted getting only a 50% throughput or a 1.5 in-crease. This became more dra-matic when we found we could lease Model 50s with 512K for about 48% of the list price,"

Wanglan said. "There is very little 370 third-

party equipment available at an attractive discount, within a rea-sonable time frame," he added. For the 360s the bank could get a good discount and sign up for only 12 months, he said, and this still left room for upgrad

within a short time, Current third-party lease prices are about 55% of IBM list for 90-day cancellation privileges, and 48% of list for a 12-month commitment, he said. This in-cludes the option of a no-penalty upgrade as long as the customer stays with the same lessor, he said.

But Wanglan thinks he will be forced into a 370 by 1974 be-cause IBM will probably drop OS support for 360 users. By the end of 1973 users will have to pay for OS support, he pre-dicted, "We know that all of the 360 peripherals are no longer in

360 peripherals are no longer in manufacture; they are rehabbed machines," he said.
"So into 1974 IBM will do a good job of constraining the desirability of staying with 360s much longer," he said.
While Wanglan said he has some 370 orders with IBM, the would not rule out other alternations.

would not rule out other alterna tives if they were financially at-

tractive. tractive.

The bank now has dual 512K Model 50s but the second is required for backup. One 360/50, at 48% of 1BM list, with 360/30, at 48% of 18M list, with 512K, cannot he duplicated with a similar 145, Wanglan said. "We would instead have to go to a 155 or a 158 and the cost spread would be phenomenal. You would be taking about a quarter of a million dollars per year," he

At Chrysler's Airtemp Division IRM had installed a 370/155 but the firm decided to look around for some way to cut costs. The for some way to cut costs. The best way seemed to be with a third-party lease," said Lynn McKinley, DP manager. "We found that a 360/65 with

"We found that a 360(65 with independent 3330-equivalent disk drives was the best thing that we could get," he said. "We benchmarked 2314 disks on both the 65 and 153 and found the 65 outperformed the 370. We felt the 65 would be at least equivalent with the 3330-type drives," he said.

McKinley expected some deg-radation with the 3330-type units on the 768K 65 because the system "would lose the block-multiplexer function." But if the block-multiplexer feature is also added to the Model 65, as announced by some of the independents, it will be "an ex-tremely fast machine," he said. "We have been running for two weeks with the 65 and we weeks with the 65 and we haven't noticed any deteriora-tion in throughput," McKinley said. Chrysler runs "every type of application" including inventory control, production con-trol, finance, sales, personnel files and industrial engineering jobs, he said, "And there has not

been a noticeable degradation anywhere," he said.
The company has 1tel 7330
disks and IBM 3420 tape drives
with the system on third-party
lease. The IBM 155 was "the
equivalent of what we have on
the 65," McKinley said.

The savings enjoyed by switch-ing to the 65 will be "between \$270,000 and \$300,000 per

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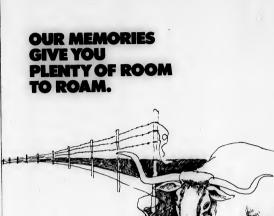


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### Two Users Agree:

# 360/50 Better Price/Performer Than 145

Of the CW Sleff
If a 370/145 offers users a 50% throughput increase for just a a 360/50, why are several users finding the 360 unit a more ef-fective price/performer?

fective price/performer?

The answer is simple: They are comparing lessed 360/50s against 370s rented directly from 1BM but the prices of the

from IBM but the prices of the Sos offered by third-party leasing companies can change the equation completely. Keydata Corp., Watertown, Mass., found the 145 was a better throughput performer than the 50 by about 50%. And in terms of IBM prices for the source expensive, wallounds a source expensive, wallounds a better deal on a price/performance basis.

mance basis. But Keydata looked around to see what type of deal they could get on a 360/50 from the thirdger on a 3600/30 from the thrup-party leasing companies and found that Itel was offering the system at between 50% and 65% of the original IBM rate. If the 145 gives a 50% better performance for about the same

price, the price/performance ratio is 3 to 2 in favor of the 145, according to John Hermi-stone, general manager for computer operations at Keydata.

But since the third-party lease
rates have fallen to around 50% of the rental rates from IBM, it is now possible to get two 50s for the price of one 145.

This tips the price/performance ratio to 4 to 3 in favor of the 50s, Hermistone explained, and in addition gives the user some

benefits not available with the one system shop. The greatest additional benefit is backup, he noted. If one sys-tem is down the user can still operate on the second — operate at a reduced level, of course, but still remain on the air.

Another advantage is that there are no overtime charges when the systems are leased from third-party firms, he said. Keydata was paying approximately \$3,000/mo in overtime charges to IBM with the 145.

In fact, a leasing company ex-ecutive claims, "we have been able to prove in the majority of cases that a 50 leased from a third party is a 20% to 25% better price/performer than the 145," even before the overtime are figured into the

equation.

At Keydata, which went from one 145 to one 50 with plans to upgrade to two 50s, the savings amounted to around \$108,000/

Another user who made the same evaluation is Golden 50

which replaced one 370/145 with two 360/50s for about the

same price same price.

On a price/performance basis
"we're ahead of the game," Joe
Lavin, director of DP, said in
discussing the move.

Before the switch, the firm was operating one leased 50 and a 145 rented directly from 1BM. The cost of the 262K 145 alone was averaging around \$18,000/mo, Lavin said.

Golden 50 threw out the 145 and got another 50 and now the total cost for the two leased 50s is just under \$20,000/mo - just he noted

Lavin admitted the 370/145 was a better performer "definitely faster" - than any
single 50, but said on a price performance basis the single 145 could not touch the perfor-mance of two 360/50s for approximately the same monthly

Golden 50 is also saving in overtime charges I svin noted



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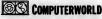
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## University Discovers Third-Party Hardware Reduces Budget by 4%

Of the CW Staff LAS CRUCES, N.M.—A saturated system and a school administration which would not allocate extra money for an upgrade led Mike Mann and the New Mexico State University computer center to investigate the "IBM—multivendor-third party world" with surprising and gratify-

party world with supplied to obtain a 300% increase in throughput while reducing the hardware budget by

4%. The initial system was a 360/50 with 256K bytes of main memory and 1M byte of large core storage (LCS) operated under OS/MVT with HASP, Mann said. In this particular environment, the operating system required over half of the high-speed core while one teleprocessing

Thus, at least while APL was running, all batch jobs were run in LCS - which

all batch jobs were run in LCS — which de many to comment that New Mexico State had the largest, most expensive Model 50 in the West, Mann noticed. However, he said, the Model 50 proved to be a sound choice in many respects; it performed reliably and satisfied requirements very well—to a point. That point was saturation, which occurred for an extended period during the spring of

Studies and evaluations indicated an upgrade was essential. For all practical purposes, Mann noted, the massive prob-lems presented by conversion to other manufacturer dictated the upgrade be limited to IBM systems. From this premise, three alternatives were considered: enhancement of the Model 307, move to a 300/65; or upgrade

Mann decided to test the university administration's willingness to commit additional funds \$90,000 - to permit acquisition of the 360/65. However, subsequent discussion of belt-tightening and extending the life of the current machine resulted in no additional hardware funds

During the summer of 1971, the five alternatives outlined were reconsidered,

with the view toward purchase as a means of lowering cost, Mann said. Preliminary discussions with third-party leasing and brokerage concerns were initiated. It was discovered that an IBM 360/65 system could be obtained from any of several third parties for about 50%

40% of IRM's commercial price. Discussions were also held with an outside vendor who could provide add-on memory, disk and tape units with considerable timing improvements over com-parable IBM units. And all of these units would more than justify a resident cus-tomer engineer, Mann noted.

In 1971 the university put out a request for bids which was separated into two

parts: A request for bids specifically for an IBM 360/65 CPU, 256K main memory, two (or more) selector channels, a multi-

two (or more) selector enannels, a multi-plexer channel, and a console unit.

• A request for bids for auxiliary memory, disks and magnetic tape units satisfying certain minimum criteria and insisting that all items be supplied by the

The low bidder on Part 1 offered an IBM 360/65 at 38% of IBM rental cost with all installation, shipping, cables and

with all installation, shipping, cables and insurance included in the price. The system also included three selector channets, two selector subchannets on the multiplexer channel and an 8080 adapter – for the independent's add-on

memory.
The low bidder on Part 2 was Amp who presented figures offering 2M bytes of Extended Core Memory (ECM), two disk controllers and 12 spindles, and one tape controller and two disk drives at a price just over 50% of standard IBM

ne-year rental rates, Mann said. When the two bids were combined, with

it was discovered that the comp tem could be obtained for some \$18,000 less than the price tag of the current

With 2M bytes of 1.8 msec core interleaved to give an effective cycle time of about 1.4 msec, Mann estimated that the proposed system would provide a

The money saved provided for one further upgrade – the addition of a second line printer and card reader for

second line prints and student use.

At the same time the current card reader, printer, controller and two communications controllers were purchased from IBM, Mann stated. A competitive summary of the old system and the new, along with the total annual cost of each is presented in table

New System 1BM 360/65, 256K 2M bytes Ampex ECM (1.4 µsec interleaved) 12 Ampex disk spindle IBM 360/50, 256K (8 µsec) 12 2314 disk spindles (60 µsec average access)
2 IBM magnetic tape units
(60K bytes)
2 selector channels
1 multiplexer channel (30 µsec average access) 2 Ampex tape drives (60K or 120K bytes) 3 selector channels 1 multiplexer channel 2 selector subchannels 2 selector subchannels 2 1430 printers 1 2540 card reader punch 1 1403 printer 1 2540 card reader punch 2502 card reader 2821 control units 1 2821 control unit 1 console unit Total annual cost: \$332,900 1 console unit Total annual cost: \$345,500

Table 1. Comparison of the Old System With the New Multivendor System

Table 1. Comparison of the Old Syst 2, also compiled by Cartilidge. The financial advantages possible with a multivendor system are now obvious, Mann said. Many of the operational problems have been resolved and much valuable experience has been gained. The installation which considers moving to such a configuration should be informed and prepar for an improved price/performance ratio, he concluded.

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The XTL, under 360/370 control, automatically retrieves, mounts, dismounts, and restores magnetic tape data sets in average access times of 11.6 seconds.

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Regional sales offices are located in New York, Chicago, Los Angeles, San Francisco, and Washington, D.C.

## Page 17 SYSTEMS PERIPHERALS

## Bits & Pieces

## Input to Key-to-Tape Unit Done by Selectric

PLAINVIEW, N.Y. - A key-to-cassette system provides full teletypewriter signal capability and outputs keyboard data from an IBM Selectric directly onto a magnetic tape cassette, according to the developer, Varisystems Corp.

developer, Varisystems Corp.

Designed as an alternative to punched
paper tape, the "Reporter" eliminates the
need for keypunching, tape tearing, chadding, spooling and other activities normally associated with paper tape, the

firm's spokesman said.

The tape drive controls a 200-foot m netic tape cassette which can store up to 645K bits of data each, in blocked format up to 256 characters. Tape speed averages 31 in./sec, the spokesman said.

Special command keys on the Selectric enable the operator to output codes used on- or off-line to drive peripherals, central

our or our-time to drive peripherais, central processors or phototypesetting equip-ment, the spokesman added. Cost of the system is \$3,470 with deliv-ery in 60 days from 207 Newtown Road, 11803.

## Peripherals for PDP-8 Users

MAYNARD, Mass. - Digital Equipment Corp. is offering PDP-8 users a new logic module designed to interface equipment module designed to interface equipment such as A/D converters, instruments, read-only memories and arithmetic/logic units to minicomputers equipped with the Omnibus bidirectional synchronous

The M1709 Omnibus Interface Founds ine mi/uy umnibus interface Founda-tion Module provides all required Omni-bus interface logic – device selectors, bus drivers/receivers and interrupt/skip cir-cuitry, the firm's spokesman said. Price is \$125 with delivery off-the-shelf.

## HP Users Offered Add-On Core

rr Users Unitered Add-On Core
SUNNYVALE, Calif. – HewlettPackard 2100 Series computers can now
be expanded to 32K core with Deconics'
2970 core memory add-on subsystem,
according to the developer.
The memory requires no hardware
changes to the CPU and works with the
existing installed core to offer a memory
access time of 250 neet, the firm's spokesman said.

spokesman vaid.

A self-contained power supply conserves
CPU power for peripheral I/O controllers
and all existing software.

An 8K add-on costs \$4,400, with the
16K add-on selling for \$7,700 from 925
Thompson Pl., 94086.

### Unit Rewinds Paper Tape

HIGHLAND PARK, Ill. - The TM/270 is a paper tape winder which collects tape that is being expelled from readers and punches at rates up to 115 char./sec or 11-1/2 in./sec, according to the devel-oper, Data Specialists, Inc. Price is \$90 from 1548 Old Skokie Rd.,

## Minicomputer Allows PL/I Programming

NEW YORK - QI Corp. has a deak-top minicomputer costing, around \$20,000 which features a PL/I language capability. The QI/I is available in 4K, 8K, 12K-and 16K-byte configurations with the PL/I compiler requiring about 8K bytes - of which 5K are resident, a firm

spokesman said.

The other language offered, a system assembler, can be linked to PL/I programs so assembler code can be used as sub-

routines, he asserted. The present storage medium is special magnetic cards which are inserted into the

## **Future System** Design Possible With Switch

By Michael Weinstein

Of the CW Staff
ZURICH, Switzerland - IBM scientists have unwrapped an experimental switching device that is reportedly much faster – by a factor of at least 20 – than

faster – by a factor of at least 20 – than experimental transistors and requires only about 1/10,000 of the power. The importance of this development to the computer user, an IBM spokesman said, is that a technology now exists to allow central processors to operate much faster than previously defined limits. The device can be switched in less than

10 trillionths of a second (picoseconds),

Time's Winged Chariot

The speed of the new device can be envisioned, the spokesman continued, by

## Looking Ahead

noting there are about as many pico seconds in a second as there are seconds

The very low power required by the new switch means it generates little heat and thus the switches can be packed closely together to take full advantage of

their speed, the spokesman asserted.

Since an electrical pulse travels about a millimeter in the time the IBM device switches, very dense packaging is essential to avoid excessive delays as signals travel from one circuit to the next, he said.

from one circuit to the next, he said.

If this switching device were to be used
in computers under its present design, it
would be necessary to enclose the
switches away from the CPU in a helium
refrigeration unit, the spokesman noted. refrigeration unit, the spokesman noted. While this presents some disadvantages, he felt the potentials of the new switches more than offset them. Further, the spokesman stated, the technology to enclose the switches is pres-

side of the unit. Each of these cards can hold 64 tracks - 160 char./track - of data for a total of 10K byte/card which can be accessed by programs, the spokes

man acced.

A disk subsystem for larger storage, the spokesman said, will soon be released.

Output from the system is via a 30 char/sec printer that incorporates proportional spacing and offers users upperand lower-case options with a haracter total capability, the spokesman

Since the printer also has forward and reverse capabilities, it can be used as a plotting unit, he added.

plotting unit, he added.
Included in the keyboard entry console
is an electronic display with 80 character
display positions. This display is used to
visually edit and correct programs or
data, the spokesman stated.

In many cases the Q1/T provides faster response than larger, batch-oriented ma-chines, such as the IBM 360/30 and

System/3, since card punching and se-quential tape storage are eliminated, the spokesman asserted.

The QI/T is specifically aimed at com-mercial data processing and text-processing users with applications such as order, entry, inventory, receivables, pay-ables and general ledger, the spokesman

In programming a typical business ap-In programming a typical business ap-plication – such as payroll – the use of PL/I permits a reduction of up to 90% in programming cost, compared to using machine language, the spokesman

Calimed.

QI Corp. will provide users with application and operating software as well as provide personnel training programs and operating aids, for the QI/T, the spokes-Future enhancements include a mag

tape system so that Q1/T output can be transferred and used by larger processors, and a 64K byte version of the system.

## Small Calculators Add Memory For Preset Programming Tasks

Burroughs and Hewlett-Packard have each announced stane incorporating Read-Only-Memory

tors incorporating Read-Only-Memory (ROM) modules to provide users with a stored program capability. Burroughs is offering two models, desig-nated the C 6200 Series, which allow the user to access up to nine application programs in memory, activated by de-pressing program selection keys, a spokes-man said.

### General Business Application

Programs are designed for general busi-ness applications; including calculation of selling price from cost and desired profit margin; automatic scheduling of com-pound calculations; preparation of de-preciation schedules; automatic exten preciation schedules; automatic exten-sions with proof totals; proration of amounts; distribution of percentages; area volume calculations; job and/or pro-cessing costing; and determination of amount and percentage of interest or decrease for comparable periods, the

spokesman said.

The C 6201 has seven application pro Ine C 6201 has seven application pro-grams, said to be common to most busi-nesses, while the C 6202 includes all seven of the C 6201's programs plus logarithm and standard deviation pro-

Both models have five storage memories used principally for storing of proof totals and/or accumulations, or hoth, re-sulting from executed programs, the

To illustrate time savings using the new calculators, the spokesman said, "only two keyboard operations are required to calculate a selling price from a known cost and a desired gross profit margin. This calculation would require seven steps

on a standard duplex calculator." on a standard ouplex calculator."

The C 6201, with seven application programs, costs \$775 and a lease price of \$24/mo. The C 6202, with nine programs, costs \$875 and leases for \$27/mo.

### HP Upgrades HP-35

Hewlett-Packard's entry, the HP-80, is designed to solve equations such as log, sin, cos, tan and xy, with a single keystroke, the firm's spokesman said.

In operation, data is entered, then a key

is depressed for the unknown. The HP-80 executes the appropriate program, calling upon required functions, each of which is red into the calculator as a subroutine, the spokesman stated.

Four temporary memory registers - X, Y, Z and T - form the operational stack storing intermediate results accessed by the calculator.

Numbers are entered into the stack from the bottom on a first in, last out basis. When a number is keyed in, it goes into the X register and is dis-played – only the X register is displayed. When "Save" is pressed, the number is repeated in the Y register. At the same time, any number in Y moves to Z, any number in Z moves to T and the old T

gic for the functional processing is in form of seven ROMs, the spokesman Logic for the functi

Like the previously released HP-35 cal-culator, the HP-80 uses reverse Polish (Lukaiewics) notation, the spokesman

Answers appear on a 15-character light-emitting diode (LED) display with one digit used for the decimal point. Cost of the HP-80 is \$395.

# 17 Happy Hookup

CDI has what you want in time-sharing terminals: Reliability. Smooth, quiet operation. Real porta-bility. Speeds up to thee times faster than conven-tional terminals. And prices that make you smile.

WE HAVE IT ALL. Plus special new terminals that you told us you wanted. Such as the 1030/APL TELETERM. Or the 1030 with unique MULTICS keyboard. Or the 1030/ACT, which communicates with TELETYPES or other 1030's - and of course with your time-sharing system

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un	to	their	con	puters.	Do	vourse	lf	a	favor	and	

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TECHVEN

## The Computer Caravan welcomes

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The 10 city 1973 Computerworld Caravan will feature the unique Ampex two-in-one TM-34 for 360 and 370 computers—two 3620-replacement tape drives in one cabinet that can reduce total space for drives and controllers by 50 percent. Also highlighted is the Ampex DS-330 disk storage system julg replacement for either the 3330 or the 3333 system plug replacmeent for either the 333 and available at a 15 percent savings to users.

Information will also be available on Ampex's complete line of Mainframe memories for IBM 370/360. Univac and DEC

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## The Computer Caravan/73

COMPUTERWORLD

'Hard Line' With Suppliers Paying Off As S&H Shapes Training to Staff Goals

By Don Leavitt

NEW YORK - A DP training program can succeed if it shows a genuine interest in the programmers and analysts to be trained, a business-like concern for the managers involved and an overriding

demand for value received from outside vendors That is the approach followed by Gall Buerger in her two years as DP training director for Sperry & Hutchinson, and it appears to be working well. Her first major project was to gain profile definitions for existing jobs, not just from formalized job descriptions, but from the people doing the work.

Training Time Preclo

Once training is planned, it is tentatively but formally scheduled, even if it is a self-study program. The programming manager concerned is asked to approve the schedule for his subordinate, but if that is impractical, to assign a substitute so training time will not be lost.

S&H utilizes a broad assortment of tools, tech-niques and courses, developed both in-house and

outside the company, to cover desired subjects. But at least one outside vendor had his course canceled two days before it was to be given, because he had not completed the customization of a standard course that S&H had contracted for. The initial profile definition project worked, Buerger explained recently, because she inter-

## Education

viewed each programmer and analyst as well as having them complete a questionnaire. The inter-view brought out the workers' own goals, es-

view brought out the workers' own goels, e-pecially once they realized that anything they told Buerger was treated as privileged information. There is no point in putting people in courses they don't want, she said, recalling a "canned" systems and project control course brought in from the outside. That felf flat because the pre-senters could not relate the concept's to the S&H

situation, she said. The company has inadequate training facilities and If there are only a few students scheduled to take a course that is offered elsewhere by an outside vendor, is offered elsewhere by an outside vendor, S&H will send its workers out. They have, for example, attended classes at IBM, Advanced Management Research and Software Sciences, she said.

Software Sciences, she said.

Courses that are essentially brush-up exercises are usually conducted in-house, but here again S&H may use instructors from outside or its own staff. A customized course on ANS Cobol optimiza-tion is given "about once a year" by

A session on RPG is given "when it seems worthwhile" by an IBM teacher, but the 10-week course for trainees is given by Buerger herself. There are some 75 programmers and

There are some 75 programmers and analysts, and 160 people overall in the S&H DP department. They have a 370/155 operating in OS/MFT, which is to be converted to MVT, though no timetable has been set for the changeover. Deltak's multimedia course on OS for applications programming is heavily used at S&H, but not always as Deltak had intended. The readings are generally pre-sented in lecture form, for example, and

## College Consultants Sponsored by ACM

NEW YORK - Through its College Con-sultant Service, the Association for Com-puting Machinery (ACM) is prepared to underwrite the normal professional fees and \$100 of travel expenses to subsidize visits of computer experts to interested colleges in support of undergraduate edu-

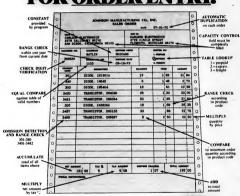
The colleges need not have computer science courses or programs as such, but they must be accredited institutions offering at least a Bachelor's Degree, ac-cording to service director Prof. Gerald Engel of Penn State University.

As its commitment to the service, the host school would be expected to pay the consultant's room and board, and any travel expenses above \$100. The service tants in all parts of the country, to keep the travel costs reasonable

The service is currently accepting ap-plications for the rest of the 1972-73 academic year, he said, and all visits for that period must be completed by July

Further information about the service and applications for consultants should be addressed to Engel at the Computer 316 McAllister ience Department, Bldg, Pennsylvania State University, University Park, Pa., 16802.

HERE'S WHY THE SYCOR 340 IS SO POPULAR FOR ORDER ENT



User programmable with T.A.L. (Terminal Application Language)
CRT for display and edit of labels, data and

Cassette storage of control formats and data (400,000 characters)

1200-4800 baud 1BM compatible binary synchronous communications Unattended communications and remote

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30 cps to 200 lpm printing on 132-cotumn multipart forms Proven capability—5000 Sycor Terminals



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# If you think the System/360 is out of date,



## let ITEL bring you up to date.

To us, it seems like a lot of people are being coaxed into an expensive System/370 for not very sound reasons. Some are dazzled by its handsome white color. Some, by its monolithic memory. And some are just plain susceptible to that old business of "keeping up with the Joneses." They want whatever's new, because it's new.

Now, we've got nothing against the System/370. (In fact, we have already leased over \$60 million worth of them.) But we do know that in many cases a properly equipped 360 is a far better price/

performer than a 370. And our team of specialists can prove it!

You see, ITEL has over \$200 million of System/360 equipment (FOS) in its portfolio, along with AMS Monolithic Main Memory, ITEL Disk Subsystems, ITEL Fixed Head Flies and ITEL Tape Subsystems, So ITEL can assemble a 360 System that will not only outperform its 370 counterpart, but will also assure you substantial savings.

Let's look at an example: If you lease a System 360/65 with AMS Monolithic Main Memory (up to 4 million bytes!) and ITEL 7330 Disk Drives, you get a computer that's equal to or greater in power and performance than the 370/153, a savings of well over \$100,000 a year! If you later decide to upgrade to an ITEL leased \$70, you are entirely free to do so. And since ITEL is a single source for both financial services and virtually all major data processing equipment, your installation is covered by a single contract that can be rewritten at any time to accommodate changing requirements.

If you think System/360 is out of date, we'd like to bring you up to date. Send for our 360 Lease Program brochure and we'll show you some surprising facts and figures that can save you a fortune. CALL THE PRICE/PERFORMANCE PEOPLE AT ITEL.

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## "That's an interesting story. Why didn't I see you at The Computer Caravan?"



## COMPUTER INDUSTRY

## CI Notes

## Pact Unsets Some SBCers

NEW YORK - keports are circulating that employees of the Service Bureau Corp., which was sold by IBM to Control Data as part of their suit settlement, are

Data as part of their suit settlement, are unhappy with the move. Several employees are bitter because they were not notified in advance of the planned changes and were not given the option to stay on at IBM in some other

apacity.
All this has some other members of th services industry jumping with glee at the prospect of picking up some well-qualified people who now may want to leave SBC for greener pastures.

### Iomec Plans Products

SANTA CLARA, Calif. - Iomec is pla ning to announce 13 new products this ring in order to broaden its line of

ucts on the Computer Caravan's 10-tour this spring.

## Supershorts

Storage Technology Corp. has agreed in principle to acquire Promodata S.A., a French peripherals marketer whose line consists principally of STC equipment.

Control Data Corp. has extended its \$1-million agreement with Fabri-Tck Inc. for extension memories for IBM 360s to \$6 million over a two-year period.

Trendata Corp. has signed an equipment purchase/lease agreement with Phoenix Leasing Inc. that provides up to \$24 million for the operating and full payout leasing of Trendata's terminals and auto-

of OCR equipment developed by OCR

Wangco Inc, has selected Marubeni Elec-tronics Co., Ltd. as Its Japanese distribu-tor of tape and disk drives.

Data Dimensions, Inc. will market Data-type Corp.'s Optical Reading System in the New York and Philadelphia areas.

The IEEE Wincon show, slated for Feb. 1.ne IEEE wincon show, slated for Feb.
13-15 in the International Hotel in Los
Angeles, will be based on the theme,
"Emerging Business Opportunities
Through New Technologies," according
to general chairman M.D. Margolis.

NCR, through its rental equipment ser-vice centers, has announced a new service under which NCR will rework printed circuit boards and MOS-LSI subassem-biles for other companies.

## Illegal Access Charged IBM Sues Telex on Trade Secret Issue

of the CW Staff
TULSA, Okla.— IBM is seeking more
than \$25 million in damages from Telex
charging that the firm uses industrial espionage and other alleged illegal tactics to
gain access to IBM trade secrets.

The broad attack on Telex, and, by The broad attack on Telex, and, by inference, on others in the peripherals industry came in a counterclaim filed last week in response to the Telex charges that IBM monopolized the computer market and attempted to stifle competition. In the brief filed with the court here, IBM denied all the charges made by Telex inm denied au the charges made by Telex claiming that such things as integrated peripherals controllers, extended and fixed-term lease plans, etc. were moves made either to meet increased competi-tion or because of advances in technology.

### Power of Persuasion

In its countercharges against Telex, the firm said Telex makes peripherals "primarily by copying, directly or func-tionally, products designed, developed and manufactured by IBM and others and minufactured by IDM and others and that to produce such copies Telex obtains IBM trade secrets and confider-nation of the confideration of the confideration of the industrial espionage, including bring IBM them, obtaining copies of IBM confider-tial documents from present and former IBM employees and obtaining other con-fidential information from various con-tacts within IBM \*\*

tacts within IBM."
The ability of Telex and "others" to cut prices below those of IBM, the complaint alleged, "has been and is primarily the result of the fact that Telex and others copy" the products offered by IBM.

"That practice gives to Telex and others a substantial competitive advantage which... is unfair and unlawful," the compliant charges and unlawful," the compliant charges and the tage of the charges are the charges and the tage of the charges are the charges and the charges are the charges are the charges and the charges are the charges and the charges are the charges and the charges are the charges are the charges and the charges are the charges and the charges are the charges and the charges are the charges are the charges and the charges are the charges ar

compisant charged.

In order to get such trade secret information, the complaint allegeu, "Telex and its officers have offered IBM employees cash bonuses based upon the completion of the copying of IBM products for Telex".

tor Telex."

As an example of this type of action,
BM charged that Telex hired "an Important IBM development engineer" who
had worked on magnetic disk technology
which had been code-named "Merlin."

IBM said it had invested over \$30 million in the Merlin project.

### 'He Made Me an Offer'

The Telex agreement with the engineer provided for a bonus of \$500,000 and stock options valued at \$50,000 if he left IBM and developed a system employing the Merlin technology for Telex. In addition, the IBM engineer was authorized, IBM said, to offer other members of the development team bonuses of up to \$100,000 if they would also leave IBM

At the same time, the counterclaim said the top 14 officers in Telex were only the top 14 officers in Telex were only paid bonuses amounting to \$129,000, "approximately one-fourth the bonus contract with this one individual em-ployee hired from IBM to pro-duce...copies of the Merlin tech-

The addition, IBM charged that top Telex-officers "have gone to far in imple-menting their routine misspropriation of IBM trade secrets as to advance their own personal funds to induce IBM employees to leave their jobs" and make trade secrets available to Telex. IBM also charged that "Exp had vio-lated the copyright law distributed of different IBM technical amanular or plati-cations, each of which infringes a valid IBM copyright." In addition, IRM charged that top Te

IBM copyright."

For relief, IBM asked the court to award

"The net income of Telex Computer Products, Inc., for the years 1970, 1971, 1972 and to date, an amount not less

· "The difference between the am-The difference between the amount IBM expended to design and develop the products which Telex has missp-propriated and used trade secrets and other confidential information and the amount expended by Telex to develop the same products."

IBM also asked the court to enjoin Telex from further use of trade secrets or other proprietary information and from assigning any employee hired from IBM assigning any employee hired from IBM to projects relating to the same types of products he worked on while at IBM. Telex said the charges were "without merit."

## Industry Generally Welcomes **IBM Key Entry Competition**

By E. Drake Lundell Ir Of the CW Staff

industry reaction to IBM's introduction of the 3740 key entry system in the U.S. was muted last week since most marketing men in the key entry business had expected the announcement ever since IBM brought out the unit in France [CW,

JUC. 4.

Most observers agreed the move would be a boon to both the present data entry industry as well as to new competition.

"It's better to have them in the market than not." one observer said, since many users would not accept new techniques until those techniques received IBM's blessing in the form of a product.

IBM's acceptance of the concept of key entry equipment that falls somewhere between the keypunch and direct ornice data entry should also serve to educate users about this type of equipment, others said.

"After IBM does the education job and "After IBM does the education job and gets the user interested in the products, we should have an easier time selling to them," one marketing man said, "since we can offer products that are better on a

price/performance basis.

"Of course," he admitted, "IBM is going to be a major factor in the market and is going to sell a lot of the units to its captive user base."

However, he added, the move should open up new market opportunities for the independents among independent users who were just waiting for IBM to endorse the concept before deciding to change from a keypunch operation to a newer method for data entry.
Industry sources were not sure exactly
how the 3740 would fit into the total date entry market. They noted the device was aimed at small installations, but said it might carry a price tag that is too steep

for many smaller users.
They agreed the 3740 would not provide major competition for the large shared-processor or key-to-disk systems offered by such firms as General Computer Systems, Computer Machinery Corp., Inforex, Entrex and others, since it Corp., Inforex, Entrex and others, since it would not really be price/performance competitive in large shops.

At the same time, the possible effect of the new device on the keypunch market

is unclear.

One industry observer dealing in the One industry observer dealing in the used equipment market does not feel the release of the 3740 will impact the keypunch market since the demand is so great for IBM 029s and 129s — users even

have to wait for delivery.

He feels the impact will be gradual, from the top down, with the sophisticated users with many remote installations the first to employ the floppy disk approach to data entry.

to date entry.

By pushing the concept of communications with the new unit, IBM is also
making it easy for users to upgrade from
the 3740 to direct on-line data entry, one
source noted, adding that IBM had been
pushing the concept of direct data entry

One note of worry in the industr action was for the possible effect of the IBM endorsement of the floppy disk as the storage medium for data entry sys-

## Immediate Savings for 370 Users

For the next few months, Alanthus will give you a lease on your installed 145, 155 or 165 and permit you to convert to a 158 or 168 at any time during the next two years with guaranteed savings on an operating lease.

If you own your 155 or 165, Alanthus will buy it back at your book value with unique upgrade flexibility.



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**Promises** 

## Finding a Computer's Residual Value Can Be Tricky, Government Discovers By Gerald M. Galler

Just Rare Facts I

TELECOMMUNICATION MONITOR "BOSS" can satisfy

your on-line needs better, because it provides MORE FEATURES . SENSIBLE PRICE CHALITY . CREATER VERSATHITY . IMPLEMENTATION FACE

> PLF APPLICATION INTERFACING · EXPANSION CAPABILITY AUTOMATED FINANCIAL SYSTEMS, INC. ONE DECKER SQUARE BALA CYNWYD PA 19004

Special to Computerworld Since 1961, agencies and de-partments of the Federal Gov-ernment have been required to evaluate the economics of lease versus purchase in the acquisi-tion of computer equipment.

Among the factors requiring consideration in such an analysis are cost of money (interest) and

But How ... ?

Although these factors are re-quired to be considered, very little guidance is provided re-garding how they are used. Agencies are permitted complete flexibility in establishing useful equipment life, residual value and cost of money.

Agencies not wanting to purchase equipment can establish a low residual value and high cost of money to ensure that the versus purchase analysis will always favor leasing

The establishment of the Gen-eral Services Administration ADP Revolving Fund that pur-chases equipment for re-lease to government agencies is a further indication and reaffirmation of the government's intent to pur-chase equipment if at all eco-nomically feasible. Furthermore, the success that GSA has experienced in placing into agencies from equipment into agencies from the excess equipment pool as well as operating a "profitable" Revolving Fund substantiates the viability of purchasting new (and sometimes used) equipment and recirculating it.

The increasing emphasis on purchase and reutilization of

computer equipment resulted in the emergence of what once was a relatively obscure sentence in the Office of Management and Budget Circular A-54 to one of the most controversial issues sociated with determining the evaluated cost of DP equipment in a competitive procurement. The subject in question is resi-dual value, its use and abuse.

There are at least seven basic methods of determining residual

Second and tertiary users (useful life beyond initial instal-

ation period).

• Guaranteed buy-back

Fixed percentage of lower

purchase price among qualified bidders. • Estimated used equipment value at end of government life

A dollar value set hy the agency or department prior to the procurement.

How Established?

The first questions which come to mind are, for example, who computer equipment to the gov ernment, and on what basis? Currently, each agency estab-lishes the residual value to be whatever it wants it to be

whatever it wants it to be.

Let us examine the implications associated with the material worth given to residual
value. It must either be zero or greater than zero. If it is zero, it will very likely make rental ap-pear to be less costly than purchase since, among other things, maintenance and interest are added to the purchase price but not the rental price.

zero, then it must be either less zero, then it must be either less than, equal to, or greater than the cost of money. If less than the cost of money, the evalua-tion cost for purchase will be increased by the difference and could be more costly than rent al If equal to the cost of money, the evaluation cost is the quoted purchase cost and a comparison is simply made of the quoted rental and purchase plus maintenance prices If it is greater than the cost of

money, then purchase will generally appear to be less costly than rental. In any case, if the residual value is to be greater than zero, then by what means is that value to be determined?

that value to be determined?
GSA, for example, depreciates
equipment on a straightline basis
at the rate of 15% per year, but
this doesn't always work.
For example, a component of
the Department of Defense prepared a specification and submitted it to its central procurement office for computer equipment office for computer equip-ment for approval and subse uent release for competitive IBM 360/50 was being released to the GSA excess equipment pool from the Depart of Agriculture and would be available on a three-year lease at substantial savings over com-mercially available equipment of equivalent capacity and capa

That 260/50 heurs the serial number 1, manufactured in 1963. It is currently nine years old and will be 10 years old when the lease with GSA runs out. Chances are quite good that it will be retained beyond the initial lease period for at least several more years. The system is actioning quite well and is per forming meaningful work

There is no reason to believe that it will not have a 15-year life currently used for evaluation

Has the residual value of this 360/50 increased or was it really worth a substantial percentage of its original purchase price at the end of five years? According to GSA's calculations (15% per year) it would have had a value of zero at the end of seven years. Until now, no mention has been made of hardware and software enhancements or new product line announcements which when implemented over the course of a system's life, can significantly increase the residual value, particularly when con-sidered in terms of useful years of operation beyond the first

The GE-225 was already sev-eral years old when a com-mercialized version of the Dartmouth time-sharing software was made available. The system emerged as a GE-265 and is still performing well today

Breathing New Life

Consider the GE-600 Series first announced in early 1964 and destined for a mediocre and limited existence. The emer-gence of Gecos III in 1968 im-mediately enhanced the Series 600 residual value.

announcement of the H-6000 line of compatible sys-tems, like IBM's 370 announcement, further extended the "de-sirable" life of the 600 product line. The life of the Series 600 was further extended by the recent award of the WWMCCS act worth over \$50 million for the Honeywell 6000 Series So here it is, eight years after the GE-600 was announced, and finding any for sale on the used computer market would be most improbable. The 600 system already in its last year of depre-ciated system life has at least three to five years of useful, revenue-producing life remaining. In 1967 GE could not give away a 600. If you order one now from Honeywell, you prob-ably won't be able to get it this year. So what is its residual value

year. So what is no re-today?

The government is aware of the problem. It simply chooses not to disclose it publicly until it has a solution. To this end, a special subcommittee was formed under the Ad Hoc ADP Committee of the Computer Performance Evalthe Computer Performance Eval-uation Users' Committee. Gerald M. Galler is president of

Marketing Counsellors



## Adapso Expands Role in Fiaht Against 'Incremental Marketina'

NEW YORK - The Association of Data NEW YORK — The Association of Data Processing Service Organizations (Adapso) has expanded its fight against what it considers illegal marketing of computer services by organizations whose major business lies outside the data processing area.

For years, the organization has fought the "incremental marketing" of computer the "incremental marketing" of computer services by other firms. An example of this type of marketing practice would be where an auto maker found it had extra computer time and would offer it to its

dealers on a service basis Since the firm is already underwriting the costs of its computer operation,
Adapso apparently feels the firm can
offer the service at unrealistic prices, therefore cutting into the market avail-able to Adapso's members.

"All of the responses we have received from our members and others have indicated that this problem is one of the key economic issues in the computer services industry," according to Thomas O'Rourke, president of Adapso.

"Our membership welcomes and en courages fair competition. However, it will fight tooth and nail competition from organizations who use monopoly positions and power developed in other

positions and power developed in other lines of commerce, to restrain free trade and competition in our industry." O'Rourke stated the enlarged program would be several-pronged. "First," he said, "Adapso will act as a communica-tions center or clearinghouse, accumulate evidence of unfair or illegal marketing problems, whether furnished us by our remoters or third narties. members or third parties.

econd, Adapso will do whatever it lawfully can to assist members who are actively fighting this problem, whether before administrative agencies, in the Congress, in the courts or otherwise. This

would include, under appropriate circumstances, participation by Adapso as a plaintiff in litigation.

"Third," he concluded, "to the extent we are able to do so, we will also financially assist members who are under unlawful attack from incremental marketers."

Adapso said that incremental marketing exists whenever a seller marketing a prod-uct in a separate line of commerce also markets a not insubstantial volume of

computer services, and where the following circumstances are present The first product is patented or copy-righted, or otherwise a lawful monopoly

 There exists some special relationship between the seller and the purchaser which is independent of the particular purchase-sale relationship giving rise to the questioned transaction, such as by way of dealership, franchise or license.

The seller offers its computer services only to those purchasing the major prod-

uct and not generally.

 The major product is important to the business of the computer services organizations in the pertinent market.

• The seller is of large size, relative the computer services organizations in the

### pertinent market. Daconics to Supply Minis For Atmospheric Study SUNNYVALE, Calif. - Daco

has received a contract, which could total \$1.7 million, from the National Oceanic Atmospheric Administration for three minicomputers to be used to study

The contract includes an ontion to purchase 95 additional minicomputers over period of three years.

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## Cyber 70 to Link Polish Universities

SWIERK, Poland - A Control Data Corp. Cyber 70 Model 72 will form the basis of a network system that will service several educational and scientific Insti-

utions in Polend.
The CDC Model 72 will be

The CDC Model 72 will be located at the Nuclear Research Institute here, with terminals at the Polish Academy of Sciences, the Warsaw University and the Technical University of Warsew, as well as the Warsaw University
of Planning and Statistics.

## Foreign Orders & Installations

The system will include a full line of peripheral equipmen The main applications will be a mixture of pure scientific work, with the nuclear sciences having the major share of time on the computer.

## Other Orders, Installations

The Imperial Iranian Air Force has installed a Honeywell 6060, valued at \$3.1 million, to control its spare-parts inventory for all military aircraft.

Ciber Clinica, Sao Paulo, Brazil, has purchased a com-

paterized medical system from International Health Systems, Inc. to automate physical-exam

Shawinigan Engineering Co., a Montreal consulting firm, has or-dered a Mete 4/1130 Emulator

Computer System from Digital Scientific Corp.

Scientific Control Systems Scientific Control Systems Ltd., a British computer service bureau, has ordered its third Univac 1108 system for use in real-time and batch applications.

## Acquisitions

Neoterics, Inc., a Cleveland, Ohio-based computer service organization, hes acquired RPA Computer Services, Inc. of Columbus, Ohio.

Granite Menagement Services, Inc. has acquired Capital Ven-tures Inc., the mortgage banking subsidiary of Empire National Bank of Newburgh, N.Y., for an unspecified amount of cash and

Analog Devices has agreed to surchase certain assets of Megadyne Industries, Inc., manufacturer of precision thin-film resistor networks and thin-film for an undisclosed amount of cash

Itel Corp. has agreed to acquire Pyramid Industries, a Los Angeles-based computer service company. Pyramid will be

merged into the DP division o

action.

Intranet Computing Corp.,
memory manufacturer, has acquired Blo-Optronics, Inc., a Los
Angeles-based manufacturer of
medical instruments.

Omron R & D, Inc., a U.S. subsidiary of Omron Tateisi Electronics Co., Japan, has acquired a majority of the common stock of Data Memory, Inc. Data Memory manufactures video-disk recorders for television and instrumentation industries.

Citizena Financial Corp. has agreed in principle to acquire Northeast Date Com, Inc., a sub-sidiary of The New Haven Sav-ings Bank. Northeast Data Com will be combined with Citizens Financial's data service unit.

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## Different Trends

## Two Software Houses Show Losses

Although two software firms have shown losses for recent periods, the trends were differ-ent, with one improving its ledger, and the other going from profit to loss

Applied Logic Corp. cut its losses for the year ended Sept. 30 to \$271,061 or 15 cents a share from last year's \$2.7 mil-lion loss. Cybermatics Inc., how-ever, ran into problems on two large fixed price contracts, and

large fixed price contracts, and showed losses in both the second quarter and six months.

At Applied Logic, fourth quarter earnings of \$75,249 on revenues of \$88,958 helped reduce losses for the year. The implementation of quasi-reorganization at the start of fixed 1972, and continuing improvements in and continuing improvements in the cost to revenue ratio contributed to the decreased losses.

Second quarter revenues were stable at Cybermatics, remaining around \$1.8 million in both the

1971 and 1972 periods. The loss for the quarter totaled 586,656 or 9 cents a share com-pared with earnings of \$98,670 or 9 cents a share in the year-ago

In the six months, revenues totaled \$3.7 million compared with \$3.2 million in the year-ago period. The loss totaled \$43,568 or 4 cents a share compared with earnings of \$160,917 or 15 cents

problems on two large fixed ware Division; each of the other divisions - Carci Computab Systems, Inc., Irademark Ser-vice Corp and Automated Labels & Forms, Inc. – continued to show substantial revenues and contribute profits," explained contribute profits,"

## Losses Included

Losses, both incurred and pro-jected, on these projects have been included in the second

## Trilog Explains Loss PHILADELPHIA - Trilog Associates reported a first quarter loss of \$8,661 on reve-

es of \$437,293. In the comparable year-ago period, the fi earned \$15,519 on \$451,298.

New product development pro-grams have been curtailed in the period, and amortization begun period, and amortization begun on several products in develop-ment last year, noted President Donald J. Devine. In the three months ended Oct. 28, software amortization exceeded capitalization by about \$11,800.

Custom systems engineering project business continues to de-cline, and the firm is "directing its attention to the further development of custom facilities management services, package soft-ware and package processing ser-

We now expect to complete the second contract by the end of 1972 and at that point will be free of all unfavorable contracts. The division should be able to reestablish the pattern of growth it experienced in prior years," he

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& Dimes

IRM's board of directors has recommended a live-lor-four stock split and boosted the quar-terly dividend on presplit com-mon stock by 5 cents to \$1.40, payable March 10 to stock-holders of record Feb. 14.

Computer leasing at two diver-sified firms. DPA and Dearborn-Storm "continues to provide sub-stantial cash flow." DPA's leasing unit had record sales in the year ended Nov. 30, and helped repay debts of over \$7 million. ough Dearborn-Storm's division had decreased earnings and revenues in the year ended Oct. 31. all mainframes continue

GRI Computer's sales for the six months ended Oct. 31 grew from \$425,000 to \$637,000, but at the same time losses increased from \$71,000 to \$367,000. Start-up and development costs Florida contributed \$90,000 to the period's losses, and the GRI-909 series was phased out while the GRI-99 series began.

The "strong upswing" at Elec-tronic Associates for 1972 stemmed from increased demand for the firm's computer prod-ucts, especially the Pacer sys-tems introduced last spring. EAI tems introduced last spring. EAI
expects to report operational
per-share net of about 34 cents
for 1972, up 240% from 14
cents lest year. The firm begins
1973 with a \$16 million backlog, whereas last year the order load stood at \$14 million.

Computer Control Systems has changed its name to Tele-

Several firms have begun the new year with increased lines of new year with increased lines of credit from their bankers. Four-Phase Systems has extended its line of credit to \$10 million through the Bank of America. Available on a revolving credit basis through Sept. 30, 1973, the funds will be used to finance leasing and the accounts receiv-

222 Digital Information Devices has increased its borrowing ceiling with the First National Bank of Boston from \$600,000 to \$1 million, and converted such borrowing from short-term to long-term debt payable Sept. 30,

Lundy Electronics & Systems has secured a \$5 million two-year agreement with the First National City Bank of New York and the Security Bank of Long Island.

PDP 8/I Serial #3086 Teletype Model 33TU Acceptable for Maintenan Available: Immediately Price: \$6500.00

W/ COMPUTER SALES INC.

618 Fax Pavillen Jenkintown, Pa. 19046 (215) 227-5404

## Sperry Rand Sets Records In Quarter, Nine Months

NEW YORK - Strong demand for computers, as well as other capital goods, has helped Sperry Rand boost third quarter earo ings 43% on a 25% increase in

In the nine months ended Dec. 31, Sperry Rand scored about a

50% rise in earnings on a 25% jump in revenues.

Both periods set records for the firm and gains are expected to continue through the fiscal year, according to Chairman J. Paul Lyet. "Revenues, net income and bookings for Sperry Univac computers in the nine months were well shead of the comparable period last year,

observed Lyet In the third quarter, carnings

totaled \$23.4 million or 68 cents

stated \$16.4 million or 48 cents a share in the year-ago period. Revenues climbed to \$565.4 mil-lion from \$453.9 million in the same quarter last year.

In the nine months, carnings umped to \$60.8 million or \$1,77 a share on revenues of \$1.6 billion. In the same period last year, earnings totaled \$40.7

ues of \$1.3 billion nues or \$1.3 billion.

The earnings per share for the nine months equaled that for the entire previous fiscal year ended March 31.

march 31.

"We are benefitting directly from improved internal operations coupled with a stronger demand for capital goods as industry increases its investment in a new plant and equipment,"

Lyet note: Lyet noted.

Despite Revenue Rise Xerox DP Still in Red

STAMFORD. Conn.—Although worldwide revenue from the computer segment of Xerox Corp. rose 19% to about 586 million, the unit continued to show a loss, while total Xerox earnings rose 17% for the year to \$249.5 million.

Revenues in the computer unit Diablo Systems, Inc., acquired

during the year Heavy investments in product development and expension of marketing forces contributed to the unit's loss for the year, ac-

However, he explained, "we see significant progress coming in 1973, and we are very hopeful that within three years at the outside, we will get to break even in what you would consider our traditional computer busi-

McColough expects computer operations in smaller operating loss and "signi-ficantly" lower inventory write-

offs than in '72.

The computer segment showed about the same deficit and writeoffs in 1972 as it did in 1971, he said, or about \$24 million in pre-tex operating loss and \$14 million in pre-tex writeoffs, for a \$38 million deficit.

Yerny plans to introduce over a dozen new products during the year, which are expected to be in the computer, facsimile and

Data General Doubles First Quarter Net

SOUTHBORO, Mass. - Dete General Corp. more than dou-bled its first quarter cernings in the period ended Dec. 23 Earnings jumped to \$1.3 mil-lion or 46 cents a share from a portated \$595,000 or 22 cents a

share in the year-ago period. Revenues rose to \$9.8 million from \$5.3 million in the first

from \$5.3 minion in the same quarter last year. The results for the previous year's quarter were restated to reflect a pooling of interests.

## \* WANTED \*

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UNITED DATA SERVICES COMPANY, INC.

## ίĮ

# Computerworld Stock Trading Summary

All statistics
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and formetted by
TRAGE #QUOTES, INC
Cambridge, Mess 02130

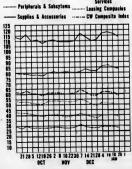
			CLOS I	G PRICE	S WEONESO	١٧, ,
E X C		19T2 RANGE	CLOSE CLOSE JAN 25 1973	WEEK NET CHNGE	WEEK PCT CHNGE	EXCHONAN
	SOFTWAR OVANCED COMP TECH PPLIED DATA RES- PPLIED LOGIC UTOMATIC DATA PROC RANDOM APPLIED SYST OMPUTER DIMENSIONS OMPUTER OYNAMICS	E & EOP SE	2 3 1/4 2 3/4 86 7/8 3/4 3 1/2	-3/0 -51/8 -1/2	0.0 -10.3 0.0 -5.5 0.0 -12.5 0.0	
0 0000000	OMPUTER OYMAMICS OMPUTER NETMORK OMPUTER SCIENCES OMPUTER TASK GROUP OMPUTER TECHNOLOGY OMPUTER USAGE OMPUTER USAGE OMPUTING & SOFTMARE OMRESS	3- T 4- 10 1- 2 3- 8 7- 14 11- 28 1- 3	3 1/4 4 5/8 1 3/8 2 3/4 8 1/8 10 3/4	0 - 1/2 + 1/8 + 1/4 - 3/8 -2 1/4	0.0 -9.T +10.0 +10.0 -4.4 -17.3	NAMOONN ANDONNA
0 C C C C C C C C C C C C C C C C C C C	OMSHARE IATATA B EDP RESOURCES LECT COMP PROG ELECTRONIC OATA SYS. INFORMATICS	5- 10 4- 9 2- 8 1- 5 43- 65 5- 11 1- 3	9 4 2 3/4 1 5/8 52 3/4 4 3/4 3/4	+ 5/8 + 1/8 + 1/4 0 - 3/8 - 5/8	+7.4 +3.2 +10.0 0.0 -0.7 -11.6 0.0	020 2220
0 H	CEANE ASSOCIATES (EYOATA CORP LOGICON ANAGEMENT DATA NATIONAL INFO SRVCS DN LIME SYSTEMS INC	4- T T- 13 4- 9 4- 10 8- 36 1- 5	3 3/4 10 3/4 3 3/4 3 7/8 33 5/8 2 1/4 24 1/2	0 -1 - 3/8 - 1/2 -2 1/R + 1/R -1 1/2	0.0 -8.5 -9.0 -11.4 -5.9 +5.8 -5.7	
0 0	PLANNING RESEARCH PROGRAMMING METHODS PROGRAMMING & SYS RAPIDATA INC SCIENTIFIC COMPUTERS SIMPLICITY COMPUTER 185 COMPUTER CENTERS	5- 1T 20- 25 1- 2 5- 27 2- 4 1- 5 3- 6	4 T/8 23 3/4 3/4 23 1/4 1 1/2 3 1/2 3 3/4	- 1/4 - 1/4 - 1/4 - 3/4 0 + 3/8 - 1/8	-4.R -1.0 -25.0 -3.1 0.0 +12.0 -3.2	
0	TCC INC TYMSHARE INC UNITED DATA CENTER	7- 12 5- 8 8- 26	1/2 10 T/8 6 8 1/2 5 374	- 1/8 + 1/4 0 - 1/4 -1 1/4	-20.0 +2.3 0.0 -2.R -17.R	40 NM
NO NO 0 4 N	URS SYSTEMS  PERIPH ADDRESSOGRAPH-MULT ADVANCEO HEMORY SYS AMPEX CORP ANDERSON JACORSON BEEHIVE HEGICAL ELEC ROLT, BERANEK & NEW CALCORP CALCORP CALCORP	27- 49 12- 23 5- 15 4- 8 1- 8 5- 21 9- 14	1/2 10 T/8 6 8 1/2 5 374 8SYSTEMS 27 21 1/4 5 3/4 4 3/4 6 T/8 10 5/8 9 1/R	-3 3/8 -1 3/8 - 1/4 - 1/8 - 3/8 - 1/4 - 1/4	-11.1 -6.0 -4.1 -2.5 -5.1 -2.2 -2.6	A 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0	CAMBRIDGE MEMORIES CENTRONICS DATA COMP CODEX CORP COGNITRONICS COMPUTER COMMUN.	9- 15 6- 28 6- 25 2- 5 1- 7	10 3/4 12 3/4 23 1/4 17 1/4 2 1/4 3 3/8 2 1/2	- 1/4 + 1/4 - 1/2 0 + 1/8	-4.4 -1.9 +1.0 -2.R 0.0 +3.8	E
0 0 N A 0	COMPUTER MACHINERY COMPUTER TRANSCEIVER COMPUTEST CONRAC CORP OATA PRODUCTS CORP OATA RECOGNITION OATA TECHNOLOGY	7- 13 2- 9 3- 9 24- 39 3- T 1- 5 2- 5	10 5/8 4 1/2 3 3/4 27 1/2 4 2 1/2 3 7/8	-1 5/8 - 3/8 - 1/4 - 7/8 0 +1 1/4 + 1/4	-13.2 -7.6 -6.2 -3.0 0.0 +100.0 +6.R	٦
0 2 2 0 0 2 0	FLECTRONIC M & M FABRI-TEK GENERAL COMPUTER SYS GENERAL ELECTRIC HAZELTINE CORP INFOREX INC	3- R 2- 5 6- 16 59- 74 7- 13 18- 36	3 T/8 4 5/8 4 1/4 7 3/4 68 1/2 8 1/8 17 3/4	- 1/8 - 1/8 - 1/3 + 3/4 -3 3/6 + 1/2 -1 T/6	-2.6 2 -10.5 +10.7 -4.6 +6.5 -9.5	
0 A 0 A N 0	INFORMATION DISPLAYS INFORMATION INTL INC LUNDY ELECTRONICS MANAGEMENT ASSIST MILGO ELECTRONICS MOHANK DATA SCI	1- 5 8- 25 8- 14 1- 1 15- 44 9- 27 6- 12	1 12 1/2 8 3/4 1/4 21 9 7/8 4 3/4	- 1/6 -1 + 1/4 - 1/6 -1 1/3 - 3/4	4 +2.9 8 -33.3 2 -6.6 4 -T.0	
0 0 A 0 0 N	OPTICAL SCANNING PERTEC CORP PHOTON POTTER INSTRUMENT PRECISION INST. RECOGNITION EQUIP SANDERS ASSOCIATES	5- 16 7- 17 4- 15 7- 21 3- 13 5- 15 13- 21	5 1/4 7 7 5/6 3 6 1/4 14 1/2	- 1/4 -1 5/6	0.0 4 -3.4 8 -28.8 0.0 4 -7.6 -13.7 8 -5.6	
0000220	SCAN DATA STORAGE TECHNOLOGY SYCOR INC TALLY CORP. TEXTRONIX INC TELEX MILTEK INC	4- 13 17- 39 7- 11 8- 15 34- 64 515 10- 26	3 5/8 28 10 1/4 13 1/4 51 5/8 5 3/8 14 ESSORIES	-1 1/	8 -9.3 4 -4.2 2 -4.6 2 +3.9 8 +1.2 2 -8.5 2 -9.6	
0 A A O N O O	SUPP BALTIMORE BUS FORMS BARRY WRIGHT DATA DOCUMENTS DUPLEX PRODUCTS INC ENNIS BUS, FORMS GRAHAM MAGMETICS GRAPHIC CONTROLS	5- 9 9- 14 17- 26 8- 16 6- 10 15- 27 11- 15	8 10 1/8 21 3/8 9 1/4 7 7/8 17 3/4 11 1/4	+ 1/	2 +6.6 8 -11.9 8 +1.7 4 -2.6 0.0 4 -6.5 4 -2.1	
N 0 N 0 0	M COMPANY MOORE CORP LTD NASHUA CORP REYNOLOS & REYNOLD STANDARD REGISTER	76- 88 42- 57 48- 62 37- 71 14- 20		+ 1/	8 +0-1	

		1972	CLOSE	MEEK	WEEK
		RANGE		NET	PCT
		(1)	JAN 25 1973	CHNGE	CHNGE
	TAR PRODUCTS CO	14- 23	21	- 3/4	-3.4
		21- 28	20 1/2	-1	-4.6
	UARCO	6- 11	4 7/0	+ 1/8	+1.8
	WARASH MAGNETICS	21- 26	20 1/2 6 7/8 25	- 1/2	-1.9
	WALLACE BUS FORMS	21- 26			
	COMP	OTER SYST	EMS		
	BURROUGHS CORP	14T-230	220 5/8	-7 3/8	-3.2
	COLL INS RADIO	14- 2T	21 3/4	- 1/4	-1.1
	CONTROL DATA CORP	14- 2T 43- T8	55 1/4	-1 1/8	-1.9
	DATA GENERAL CORP	56-130	121	-6 1/2	-5.0
	DIGITAL COMP CONTROL	5- 25	5 1/4	-1 7/8	-4.5
	DIGITAL COMP CONTROL	72-101	96 1/2	-1 7/8	-1.9
	ELECTRONIC ASSOC.	6- 13	8 1/8	- T/8	-9.T
	ELECTRONIC ENGINEER.	6- 14 23- 41	8 1/2 30 1/8	- 1/8	-1.4
	FOXEGRO	13- 49	46 3/4	+ 1/4	+0.5
	GENERAL AUTOMATION	2- 5	2 1/2	+ 1/8	45.2
	GRI COMPUTER CORP	46- 94	90 3/8	+ 3/8	
	HEWLETT-PACKARO CO	118-1 TO	128 3/4	-4 3/4	-3.5
		333-444	436	+7 1/8	
	18H				
	INTERDATA INC	8- 16	11 5/8	+ 1/4	+2.1
	HEMOREX	15- 3R	16 3/4	- 5/8	-3.5
	MICRODATA CORP	5- 10	9 3/8	- 1/2	-5.0
	NCR	29- 38	29 1/2	-1 7/8	-5.9
	RAYTHEON CO	27- 47	30 1/4	-1 3/4	-5.4
	SPERRY RAND	30- 50	4T 3/4	- 1/2	-1.0
	NCR RAYTHEON CO SPERRY RAND SYSTEMS ENG. LARS VARIAN ASSOCIATES	7- 16	7 1/4	- 3/8	
	VARIAN ASSOCIATES	14- 22	17 3/8	- T/8	-4.7 -0.8
	WANG LABS.		e4 1/2		
	XEROX CORP	121-172	152 1/2	+ 7/8	+0.5
	LEAS	ING COMPA	INTES		
	CONTUR COMMITTER	3- 18	3	0	0.0
	BRESNAHAN COMP.	1- 3	1 3/8	- 1/8	-8.3
	COMOISCO INC	3- 18	15 5/8	-1	-6.0
	COMMERCE GROUP CORP	3- 18 5- 11	5 3/R	- 1/8	-2.2
1	COMPUTER EXCHANGE	1- 3	5/8	0	0.0
1	COMPUTER INVSTRS GRP	6- 14	6 3/8	- T/8	-12.0
i	COMP. INSTALLATIONS	2- 5	2	0	0.0
	DPF INC	5- 13	T 1/2	- 5/8	-7.6
ï	DATRONIC RENTAL	2- 4	2 1/4	- 1/6	-5.2
i	OCL INC	2- 10	2 5/8	. 0	0.0
ï	DEARBORN-STORM	2- 10 16- 26	22 1/2		-3.2
ï	OPA. INC.			- 3/8	-5.1
ì	GRANITE MGT	5- 11	-5 5/8	- 1/8	-2.1
١	GREYHOUND COMPUTER	6- 11	5 5/8	- 1/4	
	ITEL	7- 12	11 1/8	- 5/8	-4.0
ę	LEASCO CORP LEASPAC CORP LECTRO MGT INC ROCKMOOD COMPUTER SYSTEMS CAPITAL	15- 24	14 3/4		
ó	LEASPAC CORP	6- 15	6 3/4	- 1/2	-6.8
3	LECTRO MGT INC	1- 4	1 7/8		
À	ROCKWOOD COMPUTER	2- T		-1/6	-5.0
Ó	SYSTEMS CAPITAL	3- 20			
N	U.S. LEASING	19- 35		-1 5/8	-4.7
	KCHI N-NEW YORK EXCHAN	GE t A -AME	RICAN EXC	LANGE	
	L=NAT IONAL EXCHAN P=PHIL=8ALT=MASH	GE1 0-OVE	R-THE-COU	NTER	
	P=PHIL-BALT-MASH -t-C PRICES ARE BIO PR			D LAST 6	10

## O-T-C PRICES ARE 810 PRICES AS OF 3 P.H. OR LAST 810 11 TO MEAREST OOLLAR Computer Stocks Trading Index

- Computer Systems

----- Software & EOP



## Earnings

Reports
APPLIED MAGNETIC
YOM Ended Sept. 30

nr Ernd 162 1971 seenue 31,764,665 24,030,566 spec Chs 425,000 92,891 granings 1,990,811 1,351,191 in 1972, provision for potentiel loss n disposition of food processing tents: in 1971 from sale of sub-

SEISMIC COMPUTING Year Ended Sept. 30

Shr Ernd 8.1.13 8-78
Revenue 25,784,000 22,089,000
a Spec Cred 378,000 893,000
Earnings 1,411,000 893,000
e/n 1972, from sele of stock and
purchese of subordinated debentures;
in 1971, from purchase of subordinated debentures.

DATA DESIGN LABORATORIES
Trace Months Endet Sele 30

Shr Ernd 5.10 8.1 Revenue 2,235,509 1,840,17 Tex Cred 10,350 16,75 Eernings 112,527 114,04 a-Resteted.

PROGRAMMING INSTITUT Three Months Ended Sept. 3 1972 19

r Ernd 8.01 8.01 8.02 revenue 1,047,964 785,128 ec Cred .... 83,400 15,789 reinjos 3,566 15,789 revenue 3,093,131 2,191,773 ec Chp .... 18,508 reinjos 4,129 (11,402) findings 4,129 (11,402) findings 4,129 findings 4,

OMPUTER COMMUNICATIONS
Three Months Ended Sept. 30
1972 e1971
or Ernd 5.06
Nenue 1,600,511 \$748,188

Revenue 1,600,511 \$746,186
DISC Op (121,1513)
Tax Cred 50,000
Eernings 100,621 (627,589)
B- Resteted.
IMFOR MATION INTERNATIONAL

INFORMATION INTERNATIONAL SIX Months Ended Oct. 31 ... 1972 1971 Shr Ernd 3.491,189 \$1,297,828 Tax Crad 176,000 Earnings 380,488 (195,171)

AMPEX
Three Months Ended Oct. 28
1972 e197:
Ir Ernd 5.02

ss 2,894,000 ...

BOOTHE COMPUTER
Three Months Ended Sept. 30
1972
1972
Erndvanue \$12,718,000 14,998

Shr Ernds
Revenue 212,718,000 14,98,000
Disc Op (13,572,000) (19,000)
Revenue 0,1016,000 15,578,000
Disc Op (13,572,000) 2,475,000
Spec Cred b1,148,000
Ernings (12,334,000) 2,475,000
P.Adjusted for a 10% stock dividand in June 1972, De From sale of stock of

CALIFORNIA COMPUTER PRODUCTS Three Months Ended Oct, 1

Revenue \$12,992,000 \$13,453,000 \$10,500 \$10,000 \$13,453,000 \$13,453,000 \$13,453,000 \$13,453,000 \$13,453,000 \$13,453,000 \$13,453,000 \$10,45

INFORMATION OISPLAY Nine Months Ended Sept. 30 1972 1971 Evenue \$1,377,851 \$1,129,79 208.182 160,62

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■ Extended Spooling

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cation-catalogue any program once and execute in any partir

Procedure Library—an 'Intelligent' procedure permitting salective retrieval of catalogued job

Job Accounting—a complete deta collection, summarization and reporting system.

Taxt Editor-for documentation of your programs.

Extanded Source Library—extends the source lib support to sil languages down to the stetement le

THESE TWELVE FEATURES CONSISTENTLY PROVIDE OVERALL THROUGHPUT IMPROVEMENTS OF 25%.

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ocked Fetch—a transparent feature providing proved C.P.U. performence.

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